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BRITISH MEDICAL JOURNAL

LONDON SATURDAY FEBRUARY 13 1943

LUNG TUMOURS IN MICE AND MAN

BY

J. ARGYLL CAMPBELL, M.D., D.Sc.

From the National Institute for Medical Research, London

(WITH SPECIAL PLATE)

As the result of more than ten years' experiments (Campbell, 1934-1942b) in which mice were exposed once an hour for six hours on five days of each week for a year to a moderate cloud of dust from various substances, enough data have now been obtained for some general statistical examination. It is possible to compare with some confidence the results elucidated from statistics of human lung cancer (Kennaway and Kennaway, 1936; Turner and Grace, 1938; and others) with results obtained from the above prolonged dusting experiments with mice. Herein some comparison is made between mice and man: (1) as regards agents which increase the incidence of lung tumours; (2) as regards the morphology of the tumours; (3) as regards the time factor or influence of age; and (4) as regards the factors of susceptibility and heredity. Reference is also made to the influence of irritation, both chemical and mechanical.

Full details of the methods of investigation and of the sources and compositions of the various dusts have been given in the previous publications, and will not be repeated here. Also, full references to literature appeared in these earlier papers, and only key references will now be included. Since lung tumours are very rare in mice younger than 10 months, only older mice are considered. Usually about 80% of the control mice and about 75% of the experimental mice survive for 10 months or longer: as a rule all the mice were allowed to fulfil their allotted span of life. Further, only those experiments in which a visible deposit of dust was apparent in the lungs are at present under review. The experiments with gases and smokes are excluded.

Agents increasing the Incidence of Lung Tumours

The evidence of statistics for human lung cancer indicates that an abnormal liability to this disease has been observed among workers exposed to coal gas and tar, those engaged in the preparation and sale of tobacco, metal grinders, engineers, foundry workers, silica workers, chromate workers, some workers with a nickel dust mixture, and Czechoslovak pitchblende miners, while a somewhat high incidence has been observed in those whose occupation exposes them especially to road dust; these latter include paviours, road sweepers, and drivers of horse-drawn and motor vehicles. The inorganic substances, therefore, which appear to be dangerous are radium, arsenic, a "nickel" dust mixture, chromates, iron, and silica. As regards the new carcinogenic agents, the benzpyrene of tar and tarred road dust is more than under suspicion, while this substance is also suspected of causing lung cancer in heavy smokers, being present in small quantity apparently in the tarry matter as the result of combustion of tobacco at high temperatures; some positive results have been obtained in experiments with animals with this tarry matter.

Many of the above substances have been tested on mice, and the significance of the results for various dusts is given in Table I, by means of the statistical ratio of the difference between the percentage incidences of lung tumours in the dusted mice and the control mice to the standard error of the difference (Table I, column 5); the meaning of this ratio is given briefly in column 6 of the same table. It will be observed that the statistical evidence in favour of the particular dust increasing the incidence of lung tumours is highly significant for a sample of tarred road dust (No. 1), for a sample of a similar dust with carbon monoxide present, and also for a dust mixture containing equal parts of silica, iron oxide, alumina, and calcium carbonate. The increase in incidence of lung tumours in the experimental mice is definitely significant also with a sample of iron oxide, a sample of Czechoslovak pitchblende dust (No. 2) containing a small quantity of radium and arsenic, a sample of tarred road dust from which the tar had been removed by benzene, and a second sample of tarred road dust (No. 2). Experiments in which the increase in incidence is on the borderline of significance include a diluted "nickel" dust mixture, a bituminous coal dust from the South Wales Coal Survey, and another sample of Czechoslovak pitchblende dust (No. 1) containing no arsenic and practically no radium. Experiments in which the increase in incidence might have been due to chance include those with an exhaust soot, those with

TABLE I.—*Significance of Increase in Incidence of Lung Tumours in Dusted Mice*

Ratio (R) Numerical Order	Experiment	Percentage Lung Tumour Incidence		Ratio of Difference between E and C to Standard Error of Difference (R)	Significance of Increase due to Dust
		Dusted Mice (E)	Control Mice (C)		
1	Tarred road dust (1)	74·0	8·0	7·2	Highly significant
2	CO + tarred road dust	47·3	7·5	4·1	
3	$Al_2O_3+SiO_2+Fe_2O_3+CaCO_3$	19·4	0·0	3·6	
4	Fe_2O_3	32·7	9·6	2·9	
5	Czechoslovak dust (2)	20·3	2·1	2·8	Definitely significant
6	Tar-free road dust	44·8	20·0	2·7	
7	Tarred road dust (2)	13·1	1·4	2·6	
8a	Diluted "nickel" dust	29·8	12·5	2·2	
8b	Czechoslovak dust (1)	11·5	1·7	2·2	Some significance, but near borderline
10	Bituminous coal	12·1	1·9	2·1	
11	SiO_2 + "nickel" dust	17·4	5·0	1·8	
12a	$SiO_2+Fe_2O_3$	19·4	9·6	1·5	
12b	Carbon, exhaust soot	33·3	20·0	1·5	An increase, but might easily be due to chance
14	$Al_2O_3+SiO_2+Fe_2O_3$	15·8	9·2	1·1	
15	Steel grindings	13·6	7·7	1·0	
16	Anthracite coal	9·1	7·0	0·4	No increase of any significance
17	Coal soot	20·0	20·0	0·0	

steel grindings, and various experiments with silica and iron. Finally, no material difference in incidence was observed in experiments with an anthracite coal dust from the South Wales Coal Survey and a coal soot from a chimney.

When the value of the ratio in column 5 of Table I is 2 it means that such a difference in tumour incidence would arise by chance only once in 20 trials; if the ratio is 2.5 the difference would arise by chance only once in 80 trials, and if 3, only once in 370 trials. For higher values, of course, the risk is very much smaller still. In all the experiments there were about 50 to 60 mice in both the dusted and control groups—that is, 100 to 120 in all. If the same percentage differences between dusted and control mice were to occur with higher numbers of mice they would be of much greater significance. It is thus possible to obtain further evidence that silica and iron increase the incidence of lung tumours by adding all the results together for any of the experiments in which silica and iron were employed. This has been done in Table II, from which it will be seen that of 346 control mice 7.8% possessed lung tumour, while the incidence among 475 mice exposed to various dusts containing either silica or iron, or both, was 20.1%. The value of the above statistical ratio from these percentages is 5.2, which indicates that the difference due to the dusting is highly significant. It is likely also that the cause of the increase in incidence of lung tumours in the mice exposed to the road dust with the tar removed (Table I) is also concerned with the iron and silica it contained, as is the increase in the case of the sample of Czechoslovak pitchblende dust (No. 1) which did not contain arsenic or radium.

From the above results it is obvious that so far as many of the causes of the increase in incidence of lung tumours are concerned mice and man show very fair agreement. It is considered that the processes involved are of a prolonged chemical nature—that is, small quantities of the dusts go into solution in the tissues before producing the cancerous effect, possibly the end-result being the same with all the different substances. In most cases the dusting was of a moderate degree or less, so that only moderate deposits or less of dust were present in the lung tissue. Heavier dusting with the apparently inactive dusts might have produced more positive effects. This brings us to the consideration of the mechanical factor due to such deposits. The lungs of the control mice, of course, equally with those of the experimental mice, contain small quantities of dusts from the sawdust of their bedding, from their food, and from their surroundings in general; these dusts may exert some influence in the development of lung tumours in susceptible mice, which may explain their presence in the control mice.

Mechanical Irritation

It is possible, of course, that the masses or collections of dust in the lung tissue might cause irritation by mechanical pressure, particularly during the movements of respiration. The harder the dust, or the larger the masses, the greater would be the irritation. Also the clumps of dust might by pressure occlude blood vessels so that a local anoxia might occur, and evidence has been obtained of some influence of anoxia in increasing the incidence of lung tumours in mice (Campbell, 1940a). In addition iron compounds might be freed from any stationary blood or haemoglobin in the occluded capillaries, and a chemical effect of the iron might be thus set up indirectly.

To study more closely any influence of mechanical irritation or pressure it is necessary to have some quantitative method for measuring the experimental dust deposits in the lungs. This is possible with the coloured dusts, and also for colourless dusts if mixed with coloured dusts. From experiments with coal dust and silica it is apparent that the two dusts are ingested by the same cells, so that the extent of the coloured coal-dust deposits covers also that of the colourless silica, as proved by the distribution of the coal and fibrous tissue in the silica nodules in the mouse's tracheo-bronchial lymph nodes. With the aid of the microscope it has been possible to identify four main degrees of deposit, such as slight, moderate, heavy, and very heavy, with four intermediate degrees as indicated in Table III. A very heavy deposit indicates masses of dust which fill up about three-quarters of the lung tissue but do not appear to shorten to any extent the life of the stronger mice. Such a very heavy deposit is arbitrarily termed a 100% deposit. A moderate deposit is half this degree, or a 50% deposit. A very slight deposit indicates scattered specks and particles of the dust. In this way it has been possible to obtain eight degrees of deposit and to estimate by microscopical examination how many mice fall into each of these eight sections. These are all added together to get the total number of mice with dust deposits. Then an average degree of dust deposit for this total is easily calculated from the number and percentage deposit in each of the eight sections. This average is given in the last column of Table III, and by using these averages the degree of deposit in the various experiments may be compared. The same method is employed for the dust deposits in the tracheo-bronchial lymph nodes as shown for some of the dusts in the same table. All the experiments have been dealt with in this way, and the results

TABLE II.—*Lung Tumours in Mice in Fe_2O_3 and SiO_2 Experiments*

Experiment	No. of Mice Alive		Animals with Lung Tumours					
			Control			Experiment		
	Control	Experiment	Total	Simple	Malignant	Total	Simple	Malignant
SiO_2	63	61	5	3	2	13	5	8
Fe_2O_3	—	52	—	—	—	17	3	14
$Fe_2O_3+SiO_2$	52	62	5	3	2	12	5	7
SiO_2+methylcholanthrene	66	63	9	5	4	15	11	4
$Al_2O_3+SiO_2+Fe_2O_3$	65	57	6	3	3	9	6	3
$Al_2O_3+SiO_2+Fe_2O_3+CaCO_3$	60	62	0	0	0	12	5	7
SiO_2 (93·4%)+"nickel" dust (6·6%)	40	46	2	2	0	8	4	4
SiO_2 (75–84%)+soda lime (16–25%)	—	54	—	—	—	6	3	3
Totals	346	457	27 (7·8%)	16 (4·6%)	11 (3·2%)	92 (20·1%)	42 (9·2%)	50 (10·9%)

TABLE III.—*Degree of Dusting. Deposit in Lungs and Tracheo-bronchial Lymph Nodes of Mice*

Experiment	Organ	No. of Mice with Deposits								Total No. of Mice with Dust	Average Dust Deposit
		Very Slight, or 12·5%	Slight, or 25%	Slight to Moderate, or 37·5%	Moderate, or 50%	Moderate to Heavy, or 62·5%	Heavy, or 75%	Heavy to Very Heavy, or 87·5%	Very Heavy, or 100%		
Anthracite coal	Lung	0	13	13	15	12	1	1	0	55	45%
Bituminous coal	"	0	0	1	10	9	19	16	11	66	76%
SiO_2 (93·4%)+"nickel" dust (6·6%)	"	14	8	15	4	0	0	0	0	41	28%
Anthracite coal	Lymph nodes	1	10	6	10	6	5	0	1	39	47%
Bituminous coal	" "	1	1	2	7	4	12	10	22	59	79%
SiO_2+"nickel" dust	" "	7	17	4	3	0	0	0	0	31	26%

are collected together in Table IV, which also records the state of the lymph tissue in the lungs and lymph nodes.

The dusts produced hypertrophy of the lymph tissue in many of the mice. Normally there are very few and scattered collections of lymphocytes near the blood vessels and bronchial tubes in the mouse lung tissue; any definite increase on this is regarded as hypertrophy or reticulosis. Such a hypertrophy occasionally occurs in control mice too, so that it is necessary to divide the percentage of dusted mice with such a condition by the percentage of control mice which also show a hypertrophy. This ratio is given in column 4, Table IV, and indicates the increase in lung lymph tissue due to the dusting.

TABLE IV.—*Average Dust Deposit and Increase of Lymph Tissue in Lungs and Tracheo-bronchial Lymph Nodes*

Lung Dust Deposit Order	Experiment	Lungs		Lymph Nodes	
		Dust Deposit (%)	Lymph Tissue Increase: Dusted Mice % / Control Mice %	Dust Deposit (%)	Lymph Tissue Increase: Dusted Mice % / Control Mice %
1	Bituminous coal	76	9·6	79	4·4
2	Tar-free road dust	60	—	66	—
3	Fe_2O_3	59	2·8	45	3·7
4	Carbon, exhaust soot	53	—	47	—
5	Steel grindings	51	6·2	40	2·3
6a	$Al_2O_3+SiO_2+Fe_2O_3+CaCO_3$	46	15·6 / 0·0	30	4·4
6b	CO + tarred road dust	46	—	—	—
8	Anthracite coal	45	6·1	47	1·8
9a	Tarred road dust (1)	42	—	—	—
9b	Tarred road dust (2)	42	2·0	66	2·8
11	Coal soot	41	—	38	—
12	Dil. "nickel" dust	40	3·1	41	4·3
13a	$SiO_2+Fe_2O_3$	38	2·7	27	2·7
13b	$Al_2O_3+SiO_2+Fe_2O_3$	38	17·1	25	2·7
15	Czechoslovak dust (2)	35	2·9	62	2·5
16	SiO_2 + "nickel" dust	28	4·8	26	2·2
17	Czechoslovak dust (1)	21	1·0	31	2·4

Normally the tracheo-bronchial lymph nodes are two in number, and if the diameter is more than 2 mm. a hypertrophy is regarded as being present. The increase due to the dusting is shown in the last column of Table IV. This increase in the lymph tissue in the lungs and nodes due to the dusting may not only be an effect of mechanical irritation but also a chemical effect. There does not seem to be any very close agreement between the degree of dust deposit and the increase in lymph tissue. There are high increases of lymph tissue in the lung with the highest degree of dust deposit—that is, with the bituminous dust, and also with the dust mixtures containing alumina, which is very hard (Nos. 6a and 13b, Table IV). The hard steel grindings also produced a high increase in lymph tissue in the lungs (No. 5), as did the hard anthracite coal (No. 8). It is obvious that all the dusts increase the lymph tissue in the lungs and lymph nodes, which might indicate in general a mechanical effect. When iron was present many of the "lymph" cells in the lung appeared to be of a sarcomatous type and tended to spread out into the lung tissue; this is apparently a chemical effect (see Plate, Fig. 2).

As regards the influence of the dust deposits upon the incidence of lung tumours, it is perhaps better to consider only the heavier degrees of deposit, such as those termed "moderate to heavy" or heavier, since if mechanical irritation of the dust is a factor in production of lung tumours the heavier dust deposits should be more active than the lighter deposits. Therefore, in Table V the experiments have been arranged in the order of the percentages of the total mice with dust deposits heavier than a moderate degree. The only experiments in which half the mice or more had such heavy deposits were those with bituminous coal, tar-free road dust, and iron oxide. In column 4, Table V, the lung tumour incidences in the dusted mice (E) are given, and a glance shows that in general there is no correspondence with the numerical order of the mice which had heavy dust deposits, so that the heavier degrees of dusting in the main do not control the production of lung tumours. In order to make the comparison accurate it is necessary to consider at the same time also the incidence of lung tumours in the corresponding control groups of mice. This is shown in Table V. From the last column it is evident that all the experiments, when grouped in fours for convenience and clarity, show increases in the incidence of tumours irrespective of the numerical order for the percentages of mice with the heavier dust deposits. It may be concluded, therefore, that in general the increase in incidence of primary lung tumours caused by dusts is a chemical and not a mechanical effect; but it is not possible at present to exclude completely a mechanical factor, since the bituminous coal, tar-free road dust, and iron oxide, with the highest degrees of dust deposit, did produce increases in incidence of lung tumours of some statistical significance. There are cases of lung cancer among coal-miners, but the incidence is low compared with that for certain other industries. In the mouse experiments, too, the bituminous coal does not occupy a very high postion (Table I) as a stimulator of lung tumours, although the dust deposit in the lung in this case was the heaviest of all in degree. This bituminous coal and the anthracite coal were obtained through the courtesy of the South Wales Coal Survey Committee, on the suggestion of Dr. P. D'Arcy Hart. The results given herein are merely some preliminary results, the main experiments, undertaken for another purpose, not yet being completed. In the present experiment with anthracite coal the average degree of dust deposit in the lung was less than moderate (Table IV). In the unfinished experiments heavier deposits are expected.

TABLE V.—*Absence of General Dependence of Lung Tumour Incidences in Dusted Mice upon Heavier Degrees of Dust Deposit in Lungs*

Degree of Lung Dust Deposit Column 3. Order	Experiment	Total Mice with Deposits classified as "Moderate to Heavy" or Higher (%)	Lung Tumour Incidence: Dusted Mice (E) %	Dusted Mice (E) % for Group	Control Mice (C) %	Control Mice (C) % for Group	E/C Group
1	Bituminous coal	83	12·1	25·8	1·9	9·8	2·6
2	Tar-free road dust	60	44·8		20·0		
3	Fe_2O_3	54	32·7		9·6		
4	Steel grindings	40	13·6		7·7		
5	Carbon, exhaust soot	35	33·3	18·7	20·0	7·1	2·6
6	Anthracite coal	25	9·1		7·0		
7	$Al_2O_3+SiO_2+Fe_2O_3+CaCO_3$	18	19·4		0·0		
8	Tarred road dust (2)	16	13·1		1·4		
9	Coal soot	11	20·0	40·4	20·0	9·4	4·3
10	CO + tarred road dust	10	47·3		7·5		
11	Czechoslovak dust (2)	8	20·3		2·1		
12	Tarred road dust (1)	7	74·0		8·0		
13a	$SiO_2+Fe_2O_3$	2	19·4	18·8	9·6	7·6	2·5
13b	$Al_2O_3+SiO_2+Fe_2O_3$	2	15·8		9·2		
13c	Dil. "nickel" dust	2	29·8		12·5		
16a	SiO_2 + "nickel" dust	0	17·4		5·0		
16b	Czechoslovak dust (1)	0	11·5		1·7		

Influence of Age and Sex

The large majority of deaths from human lung cancer occur after the age of 55—that is, in the closing years of life. In mice also, lung tumours are rare until the last quarter of their average existence. These facts indicate the importance of the

time factor and point towards some very prolonged action. This is why the prolonged dusting experiments with mice have been persevered with. It is possible by means of intravenous injection of very small quantities of some new carcinogenic agents to produce lung tumours rapidly in certain strains of mice (Andervont and Shimkin, 1940). It is doubtful whether with such rapid action these results can be applied to the usual cases, in which such prolonged action seems necessary, unless it be assumed that under normal conditions inhibitory agents may also be present, as seems to be the case in some strains of mice whose lungs are very resistant even to intravenous injection of powerful carcinogens (Heston, 1942).

Although in mice and man the incidence of lung tumours is highest in the closing years of life, it might be argued that the resemblance is superficial, because a mouse lives only two or three years. In reply it may be stated that the rate of respiration is higher in the mouse than in man, and all metabolic processes seem speeded up in these small animals. At any rate, in both mice and man a relatively prolonged action of the dust seems necessary for the production of lung tumours under ordinary conditions.

In human lung cancer, males appear to be affected much more often than females, but some observers find that for simple adenoma the reverse is the case. With mice, on the whole, sex does not appear to play any great part, but in the case of the experiments both male and female mice were exposed equally to the adverse conditions. In man environmental conditions are usually different for the two sexes for a great part of the day. The entry of women into industry during the war may in time change the distribution of human lung cancer.

Influence of Heredity and Susceptibility

The milk factor recently discovered by Bittner to be so important for the development of mammary tumours in mice has apparently no influence on the incidence of lung tumours; but it is evident that by inbreeding with brother-to-sister matings it is possible to produce strains of mice either very susceptible or very resistant to development of lung tumours (Strong, 1936; Bittner, 1939; Murray, 1934; Little *et al.*, 1939; Furth *et al.*, 1933, 1941). In this respect heredity is important, and in man there is a suspicion that some such inbreeding has had an influence in the production of the high incidence of lung cancer in the Czechoslovak pitchblende miners, although the radium, arsenic, or some other inorganic substance may act as the trigger in the mechanism of its development. These substances, however, do not appear to be so active in similar miners in other places, so that heredity due to a certain amount of inbreeding in the case of the Czechoslovak miners may explain the difference. Even with this mechanism the cancers often appear only long after the miners have left the mines, so that the time factor is of great importance here too. In this Czechoslovak region there are also cases among men who have never been in the mines and have worked outside them altogether, which seems to point to an influence of heredity or some factor present in the outside dust as well as in the mine dust.

In the above mechanism of heredity genes presumably would be active. Nucleoprotein, it is said, forms part of the constitution of genes, and it appears that the same holds good for at least some viruses (Stanley and Knight, 1941). It is tempting to suggest that some link or chain in nucleoprotein may provide the bridge between the heredity theory and the so-called virus theory held by some observers for cancer in general. So far there is no evidence that a virus is concerned in lung tumour development, unless a virus is similar to a gene.

As a rule human populations, compared with closely inbred mice, are of very mixed strains, so that in man any influence of heredity must be much thinned out and scattered about, as it is in mixed strains of mice such as those used in the present experiments (Campbell, 1942b). Owing to this thinning-out of susceptibility in mixed strains, relatively large numbers of mice are required for each experiment. Human statistics in such a condition can hardly help in the solution of the problem unless it is realized that, as in the mouse, the mechanisms of development may be manifold and complex. Thus a very susceptible individual living in a moderately dusty atmosphere might be affected while an insensitive individual in a similar but very much dustier atmosphere might escape. It is this problem of susceptibility that at present interferes with the complete elucidation of the mechanism of lung tumour development. Although it is possible to name some factors which increase the incidence of lung tumours in mice and man, the ultimate *fons et origo* of the tumour itself remains obscure. Nevertheless it is obvious that dusts suspected or proved to be dangerous should be reduced as much as possible in industry and elsewhere.

LEGENDS FOR SPECIAL PLATE

Magnification in all cases × 200

FIG. 1A.—White mouse, male, aged about 22 months; exposed to bituminous coal dust for 1 year. Part of edge of lung cancer with oatlike cells (early stage) advancing on walls of adjacent alveoli. Weigert, van Gieson.

FIG. 1B.—Metastasis, in tracheo-bronchial lymph nodes, of large oatlike cells from a similar part of lung tumour, another part of which is shown in Fig. 1A. Weigert, van Gieson.

FIG. 2.—Fawn mouse, female, aged about 27 months; exposed to dust mixture $Al_2O_3+SiO_2+Fe_2O_3$ for 1 year. Small oatlike and sarcomatous cells (mostly transverse section) in part of adenocarcinoma. Haematoxylin, eosin.

FIG. 3.—White mouse, female, aged about 21 months; exposed for 1 year to a diluted Czechoslovak pitchblende dust (2), containing some inorganic substances, including radium, arsenic, silica, and iron. Lung cancer cells with formation also of fibrous tissue. Haematoxylin, eosin.

FIG. 4.—White mouse, male, aged about 29 months; exposed for 1 year to a diluted Czechoslovak pitchblende dust (1) without arsenic and radium. Transitional area from papillo-adenocarcinoma to oatlike and spindle cells. Haematoxylin, eosin.

FIG. 5.—Fawn and white mouse, female, aged about 21 months; exposed for 1 year to road dust minus tar. Part of lung cancer with various types and conditions of cancer cells. Haematoxylin, eosin.

FIG. 6A.—White mouse, female, aged about 21 months; exposed for 1 year to Fe_2O_3 dust. Primary lung cancer, papillomatous nature. Haematoxylin, eosin.

FIG. 6B.—Metastasis, in tracheo-bronchial lymph nodes, of gland-like cells from lung cancer in Fig. 6A. Haematoxylin, eosin.

FIG. 7A.—White mouse, female, aged about 27 months; exposed to steel-grindings dust for 1 year. Lung cancer. Haematoxylin, eosin.

FIG. 7B.—Metastasis near oesophageal wall (note muscle coat) from lung cancer in Fig. 7A. Haematoxylin, eosin.

FIG. 8A.—Chocolate mouse, male, aged about 25 months; exposed to a mixture of SiO_2+a nickel dust mixture for 1 year. Lung cancer with spindle and other cells. Weigert, van Gieson.

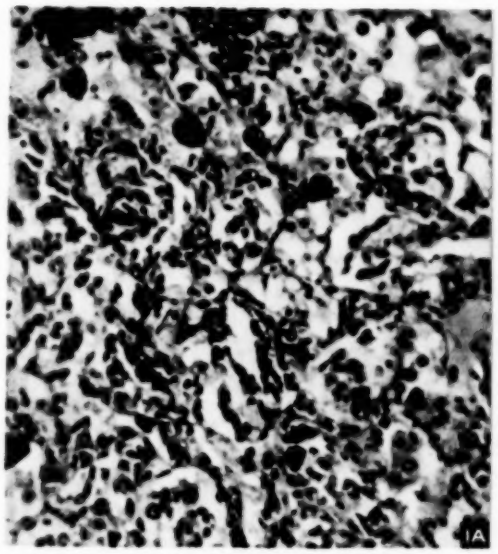
FIG. 8B.—Metastasis in tracheo-bronchial lymph node of oatlike cells from lung cancer in Fig. 8A. Some remains of lymph cells are seen in top right-hand corner. Weigert, van Gieson.

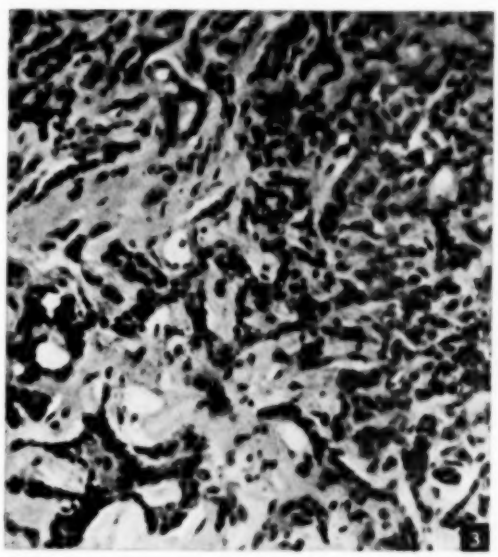
Morphology of Lung Tumours

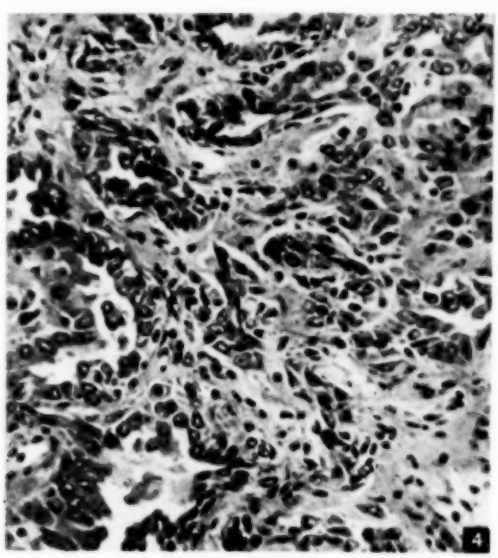
Many types of tumour cells are represented in the mouse lung tumours obtained in these experiments. There are simple adenomas, and very malignant tumours with extensions into other organs. Eighteen cases of such extensions into other organs have now been obtained among the experimental mice and only two such cases among the control groups. The most common extension is into the tracheo-bronchial lymph nodes, but extensions have been observed also in the heart, chest wall, and kidney. The tumours seem to arise often in collapsed areas of the lung, usually near the pleura; the cells become more or less cubical, and it is not possible to decide whether these cells arise from cells of the alveoli or as extensions from the terminal bronchioles. Many types of malignant cells may be found in one and the same mouse tumour, with transitions from the usual cells seen in adenocarcinoma to spindle-like cells or the larger and smaller oat cells, or to sarcoma-like cells. Some illustrations of these tumours and their metastases have been published (Campbell, 1937a), and others not yet represented are shown in the accompanying twelve photographs

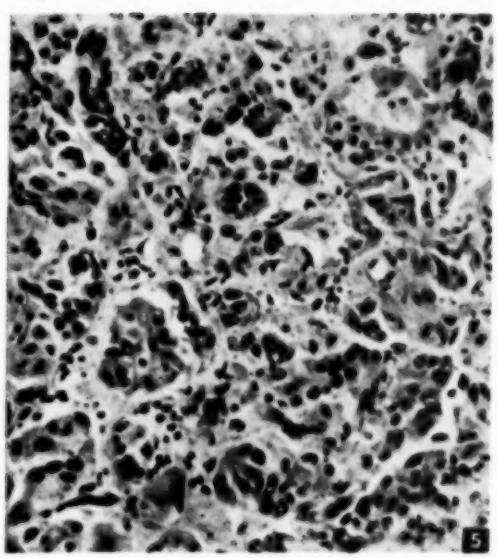
J. ARGYLL CAMPBELL: LUNG TUMOURS IN MICE AND MAN

(For legends see text)









J. ARGYLL CAMPBELL: LUNG TUMOURS IN MICE AND MAN

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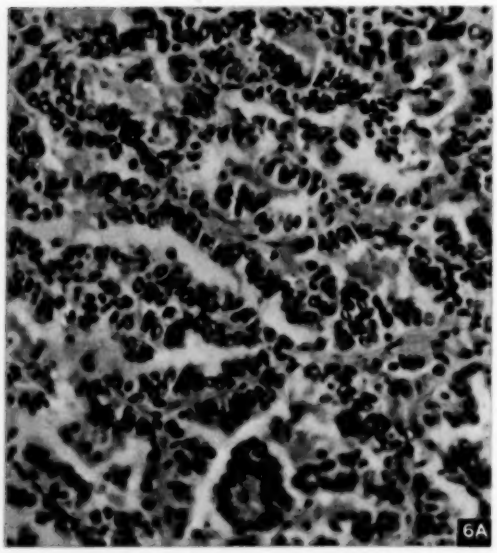

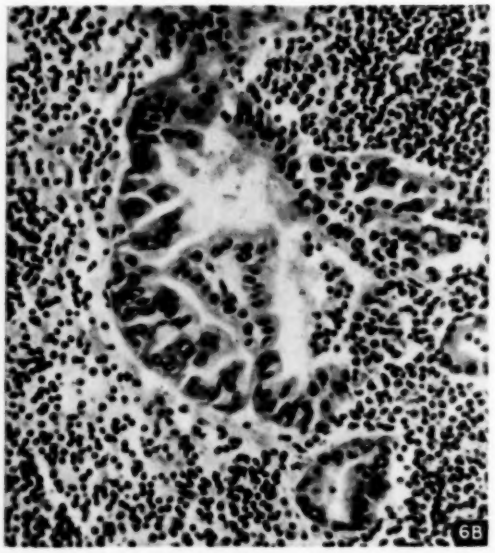

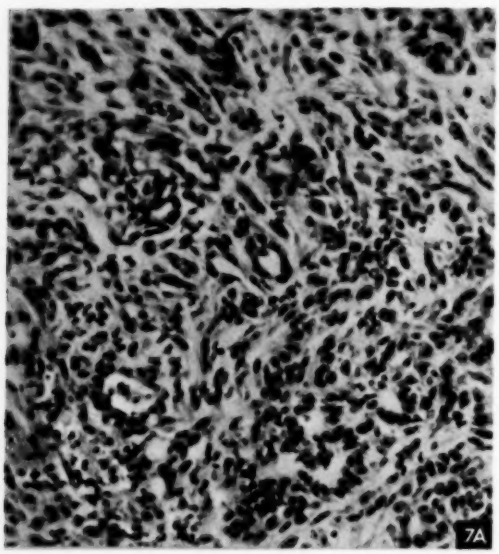

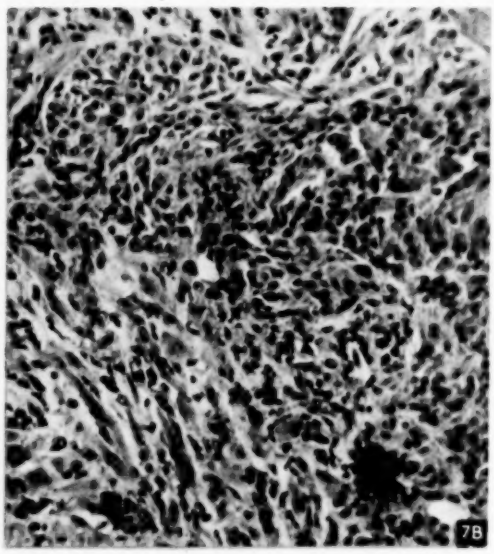

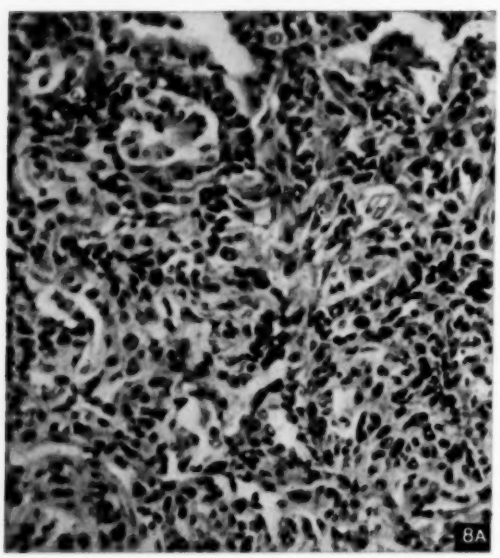

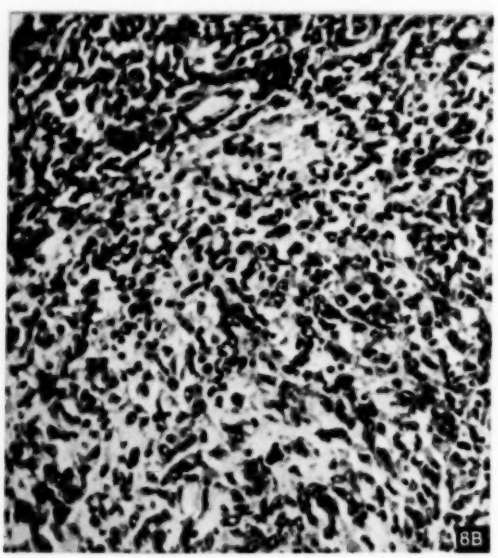

taken by Mr. F. V. Welch of this institute (Plate, Figs. 1A to 8B). At one time mouse tumours were all considered to be simple and non-metastatic because evidently they were observed only in younger mice, the mice being killed early. This idea can no longer be held, and there seem to be really no fundamental differences from human lung tumours. Benign adenomas occur in man similar to some seen in mice. Human lung cancer cells are generally classified as squamous, columnar, spheroidal, polygonal, round, and oat: representatives of all these have been seen in mouse cancers, although there may be some minor differences. In mice, although some cases of epidermoid cancer occur (Wells *et al.*, 1941), the squamous cells are seen in their lungs usually only as metastases from skin cancer due to painting the mouse's skin with tar. In man, metastases are seen more often than in the mouse, but this may be due to differences in the vascular beds or to the erect position of the human body. Also, metastases in the brain are common in man but, so far as is known, have not yet been reported there for the mouse, although one has been reported in the skull (Wells *et al.*, 1941). In addition human lung cancers are usually described as bronchiogenic, while only a few of the mouse cancers seem so closely connected with the larger bronchi; but it seems impossible to exclude completely some connexion with terminal bronchioles. Often the mouse lung cancers are described as alveolar cancers, while only 5% of human lung cancers are thus designated (Neubuerger and Geever, 1942). Such differences may be due merely to the different lay-out of the lungs in mice and man. It may be concluded that there are no sound reasons why the results obtained with the mouse experiments may not be applied to human beings. Certainly the dust experiments often seem to produce malignant tumours similar to those seen in man.

Summary

There is a similarity between human lung cancers and mouse lung cancers as regards: (1) agents which increase the incidence of these tumours; (2) the time or age factor; (3) some aspects of the factor of susceptibility; (4) morphology of the tumours.

Although the main effect of certain dusts in development of lung cancer appears to be of a prolonged chemical nature, it is not possible at the moment to exclude entirely some effect of prolonged mechanical irritation by the harder or larger collections of dust. A method for comparison of the degree of dust deposit in the various experiments is given for the first time.

The increase in incidence of lung tumours in mice by certain dusts—tarred road dust with and without the tar, Czechoslovak pitchblende dust, iron oxide, silica, a "nickel" dust mixture—is statistically significant, although in most cases the average deposits of dust in the lungs are of moderate degree only or less. Care should be taken to reduce exposure to these dusts.

Dusts produce a hypertrophy of lymph tissue in the lungs and in the tracheo-bronchial lymph nodes.

Some further illustrations of mouse lung cancers and their metastases are given.

There is no fundamental reason why the results obtained in mouse experiments with dusts should not be applied to man.

I am indebted to Dr. A. Bradford Hill for some help and advice with the statistical analysis; also to my technical assistant, Mr. C. Pergande; and to Mr. F. J. Higginson for cutting and staining the sections.

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The latest instalment of the *Index to the Literature of Food Investigation* is Vol. 14, No. 1 (June, 1942). Once more it is divided into fifteen sections and an index of authors' names. It may be obtained from H.M. Stationery Office, price 4s. 6d. net.

THE WAR NEUROSES: THEIR NATURE AND SIGNIFICANCE

BY

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The following conclusions which I have reached regarding the nature of the so-called "war neuroses" are based upon my experience of psychopathological conditions among military personnel during the present war, and more particularly in a special hospital which until recently formed part of the Emergency Medical Service.

The Traumatic Factor

The term "war neuroses" covers a great variety of clinical conditions; and there is now fairly general agreement among psychiatrists that, so far as symptomatology is concerned, the war neuroses possess no distinctive features differentiating them sharply from the various psychoneurotic and psychotic states which prevail in time of peace. Some psychiatrists have accordingly suggested that it would be more accurate to speak of "the neuroses in wartime" than to speak of "the war neuroses." On the other hand, there are psychiatrists who maintain that where cases among military personnel are concerned a distinction must be drawn between (1) a group of psychopathological states which appear to be precipitated by active warfare and (2) familiar psychopathological states which chance to occur during the course of military service but which might equally well have occurred in civilian life. This attempted distinction appears to be based on the observation that in an appreciable proportion of military cases a psychopathological state is found to have supervened upon some traumatic experience associated with warfare (e.g., a near shell-burst or bomb explosion). In contrast to this observation it is to be noted that "traumatic neuroses" are by no means unknown in time of peace; and here it must be kept in mind that, if such neuroses are less common in peacetime than in wartime, so also are violent traumatic experiences themselves. Actually it is not uncommon to find that a soldier suffering from a traumatic neurosis acquired in war has a previous history of a traumatic neurosis acquired in civilian life. In an appreciable percentage of military cases, too, the trauma upon which a "war neurosis" supervenes is found to be one (e.g., a motor accident) which is only incidentally associated with conditions of war. It is impossible, however, to dismiss the question of the part played by traumatic experiences in the precipitation of war neuroses without pausing to consider what constitutes a traumatic experience.

It is all too often assumed that a traumatic experience is one which produces a psychopathological state *de novo*. Yet, when investigation is sufficiently painstaking, it is rare to find a case in which evidence of pre-existing psychopathological characteristics cannot be detected in the previous history. It is reasonable to conclude, accordingly, that a traumatic experience is one which serves to precipitate a psychopathological reaction through the activation of pre-existing but hitherto latent psychopathological factors. The correctness of this conclusion is confirmed by the fact that in certain cases it is possible to detect a very high degree of specificity in the traumatic experience.

Admittedly in many cases the specificity of the traumatic experience is by no means easy to establish. Nevertheless this in itself may not be without significance once the principle of specificity has been recognized. Significance may also be attached to the fact that in many cases it is far from obvious why a situation precipitating a psychopathological state should possess any traumatic quality at all; for many experiences which prove to be traumatic appear comparatively trivial in themselves. Investigation reveals a remarkable range of traumatic experiences, as may be illustrated by the following examples chosen more or less at random from cases that have come under my notice: being blown up by a bomb, being trapped in the cabin of a torpedoed ship, seeing civilian refugees massacred, having to throttle a German sentry in self-defence, being let down by an officer in a tight corner, being accused of homosexuality by another soldier, being refused compassionate leave to go home for a wife's confine-

ment, and even being shouted at by the sergeant-major. When we consider the wide range of such a series the question may well occur to us whether in many cases the traumatic experience which precipitates a war neurosis may not be constituted by military service itself.

The Factor of Infantile Dependence

On the basis of data collected in the course of private psychotherapeutic practice I have gradually found myself driven to the conclusion that all psychopathological developments in the adult are ultimately based upon a persistence into later life of an exaggerated degree of that emotional dependence which is characteristic of childhood, and more particularly of infancy. The all-round dependence which distinguishes childhood requires little emphasis. It is a biological fact bound up with the extreme helplessness of the human infant at birth; and it provides the rationale of that most basic of all social institutions, the family. Since the family constitutes the primal social group, the dependence of the child, psychological no less than physical, is focused essentially upon his parents. In particular it is round his parents that his emotional life revolves; for they are not only his original love-objects but also the original objects of his hate and the objects to whom his earliest fears and anxieties are attached. In the ordinary course of development the individual's dependence upon his parents (and upon parental figures who come to deputize for them) undergoes a progressive decrease throughout the phases of childhood and adolescence until the comparative independence of maturity is reached. It is uncommon, however, for the process of emotional emancipation to prove a smooth passage; for even under the most favourable of conditions there is always a certain conflict between a progressive urge to abandon the state of infantile dependence on account of the many limitations which it imposes and a regressive urge to cling to it on account of the many advantages which it confers. Where conditions are unfavourable this conflict assumes exaggerated proportions, is accompanied by marked anxiety, and gives rise to exaggerated reactions. Whatever adjustments and compromises may issue from an acute conflict of this nature, its most significant consequence is the perpetuation of an attitude of infantile dependence in the emotional sphere—an attitude which is none the less present at deep levels of the psyche even when at more superficial levels it is overcompensated by an attitude of quasi-independence representing nothing more than a denial of the dependence which persists at a deeper level. It is the undue persistence of such an attitude of infantile dependence that I have come to regard as the ultimate factor predisposing to all psychopathological developments; and, in conformity with this view, all psychoneurotic and psychotic symptoms must be interpreted as essentially either effects of or defences against the conflicts attendant upon a persistent state of infantile dependence.

I was already well on the way towards formulating this point of view when it became one of my duties to investigate cases of "psychoneurosis" among military personnel on a considerable scale. I was thus most conveniently presented at the appropriate moment with a unique opportunity of testing the validity of my emergent views by means of a comprehensive survey of a large number of patients who had been suddenly removed from their normal environment, separated from their love-objects, and isolated from all the accustomed supports upon which a dependent person would ordinarily rely. The result was to confirm my conclusions in a most striking manner, as could be abundantly illustrated by clinical material if space permitted.

If the relationship between the development of a war neurosis and the persistence of infantile dependence is not equally obvious in all cases, this is partly because infantile dependence, in common with all characteristics, is subject to an infinite degree of variation; but it is chiefly due to the fact that the anxieties to which the state of dependence exposes the individual call into operation, in varying degrees, a number of mental defences which conceal the true position. Here it must be pointed out that a number of psychopathological symptoms themselves constitute desperate forms of defence against the anxieties attendant upon infantile dependence. At the same time there is another category of symptoms which must be regarded as products of a fundamental attitude of infantile dependence rather than as defences against its effects; and of these the most obvious and significant is unquestionably separation-anxiety. Not only is separation-anxiety invariably present in war neurotics but it is the only single symptom that is universally present. This symptom must accordingly be regarded as the greatest common measure of all forms of war neurosis.

Separation-anxiety

Separation-anxiety is so universal a feature of the war neuroses that it is difficult to believe that its prevalence can have escaped observation hitherto; and, indeed, the literature of the war neuroses does contain various references not only to this phenomenon but also to the occurrence of an exaggerated degree of dependence among neurotic soldiers. To the best of my knowledge, however, the universality and the real significance of these phenomena have never been properly appreciated even by those who have not been oblivious to their existence. The commonest interpretation placed upon them is to the effect that, like many a physically disabled soldier, the neurotic soldier wants to go home because he is ill. Even on this assumption, however, it should be remembered that the effect of illness of any kind is to produce a state of helplessness, which tends to revive an attitude of infantile dependence; but, so far as the neurotic soldier is concerned, the truth would appear to be not so much that he craves to go home because he is ill as that he becomes ill because he craves to go home. It is impossible, therefore, to draw any real distinction between the war neuroses and "home-sickness."

Another common, and misleading, interpretation of the phenomenon of separation-anxiety is that it is really secondary to anxiety over situations of danger, and that it is therefore a by-product of the self-preservation tendency. This point of view would appear to ignore the prevalence of suicidal thoughts and impulses among neurotic soldiers—a fact which is difficult to explain in terms of self-preservation. It would also appear to ignore the frequency with which breakdowns occur under military conditions involving little prospect of personal danger—e.g., among troops stationed in the Shetlands, where isolation rather than danger is the predominant feature of the soldier's life. It may be argued, however, that the wounded no less than the neurotic soldier is often found to exploit, if not actually to welcome, his disability as a means of escape from the dangers of the battlefield, and that the hope of receiving a "blighty" (to use the terminology of 1914-18) is not far from the conscious thoughts of many a good soldier in face of the enemy. It would be idle, of course, to deny the strength of the self-preservation tendency or the influence of personal danger in provoking a state of anxiety; but it still remains to be explained why some soldiers should break down in face of danger while others do not. The explanation would appear to be that the capacity to endure danger varies with the extent to which the individual has outgrown the stage of infantile dependence; and this explanation is in conformity with the notorious proneness to anxiety which characterizes the child as compared with the mature adult.

The Compulsion to Return Home

The significance of the part played by infantile dependence in the aetiology, and by separation-anxiety in the symptomatology, of the war neuroses may perhaps best be judged by the compulsiveness of the desire to return home that is such a marked feature in all cases. In cases in which the general symptomatology assumes a psychoneurotic form this compulsion, although experienced, is seldom so urgent as to give rise to marked disturbances of behaviour. In cases in which the general symptomatology assumes a psychotic form, however, the situation is otherwise; and in such cases it is not uncommon for the compulsion in question to manifest itself either in a fugue or in a consciously executed flight such as to constitute, from a disciplinary point of view, either absence without leave or desertion, or else, where the individual's sense of duty is strong enough, in an attempt at suicide.

Emotional Identification

The presence of a compulsion to return home in association with separation-anxiety is of special significance on account of the light which it sheds upon the psychology of infantile

dependence; for it serves to direct our attention to the mental process which constitutes the distinctive psychological feature of this state. The process in question is that of *identification*—a process in virtue of which the individual tends to identify himself emotionally with, and *pari passu* fails to differentiate himself from, those upon whom he depends. So far as we can conceive the mental state of the child before birth, we must regard it as characterized by a degree of identification so absolute as to preclude its entertaining any thought of differentiation from the maternal body which constitutes its whole environment and the whole world of its experience. The process of identification which subsequently characterizes the emotional relationships of childhood would thus appear to represent the persistence into extra-uterine life of an emotional attitude existing before birth. So far as it influences behaviour, it would also appear to represent an attempt to restore emotionally an original state of security which was rudely disturbed by the experience of birth.

The figure with whom the dependent individual originally identifies himself is of course his mother; and, while it is not long before he begins to identify himself with other figures, particularly his father, the original identification persists underneath all others subsequently made. The extent to which this original identification persists, even in individuals who have relatively outgrown the state of infantile dependence, may be judged from the frequency with which the wounded soldier is known to cry out for his mother in his agony. It remains true, nevertheless, that the more emotionally mature an individual becomes the less his emotional relationships are characterized by identification. In the necessarily dependent phase of early childhood it is of course both natural and inevitable that identification should play a predominant part; but when emotional development is satisfactory there is a progressive decrease in identification throughout the years of childhood and adolescence until the relative independence of emotional maturity is reached. This progressive decrease in identification is accompanied by the progressive increase of a capacity on the part of the individual to differentiate himself from emotionally significant figures. At the same time the importance of the figures with whom he originally identified himself (parents and parent substitutes) tends to diminish. Emotional maturity is consequently characterized not only by a capacity to sustain relationships with other individuals on a basis of mutual independence but also by a capacity to contract fresh relationships. These capacities are deficient in the individual who fails to outgrow the stage of infantile dependence. Such an individual remains childishly dependent upon his home and his loved ones; and he is so closely identified with them that he cannot endure any great measure of separation from them. As was the case in his childhood, they still constitute not only his emotional world but even, in a sense, himself. He feels that he is part of them and, equally, that they are part of him. In their absence his very personality seems to be diminished—and even his sense of personal identity may be compromised. Such being the case, it is not difficult to understand that, when placed under military conditions, he finds it too difficult a task to establish himself as a separate personality within the framework of the military organization, subordinate himself to the aims of the military group without any surrender of individuality, and maintain stable emotional bonds with the group while remaining differentiated from it. On the other hand, he usually finds great difficulty in either establishing or maintaining a reliable relationship with the military group on a basis of identification. This is due, of course, to the fact that his identification with his home and his loved ones proves too strong to admit of a competitor; and it is to the strength of this identification above all that the development of a war neurosis must be attributed.

The Factor of Morale

It should now be evident that identification, which is such a characteristic feature of the emotional life of the dependent individual, is not only the fundamental process underlying the development of a war neurosis but also a process imposing serious limitations upon the social adaptability of the potential war neurotic. That the process of identification should prove to be a common factor operating both in the direction of compromising social relationships and in that of promoting psychopathological developments in the soldier is a consideration in the light of which the whole problem of the war neuroses assumes an aspect that has hitherto suffered from almost complete neglect in medical literature. It is true that during 1914-18 there arose a powerful school of psychotherapists who regarded the war neuroses as products of a conflict between the soldier's instinct of self-preservation and his sense of military duty—the symptoms of the war neurotic being interpreted as motivated, albeit quite unconsciously, by a desire to find a means of escape from the danger zone without experiencing the sense of guilt which a deliberate dereliction of duty would involve. This view, at any rate, had the merit of recognizing the bearing of questions of social responsibility upon the aetiology of the war neuroses. Nevertheless, quite apart from what is now seen to be the superficiality of such an interpretation of the war neurotic's symptoms, no real attempt was made to explain the incidence of the war neuroses; and the conflict in which they were held to originate was treated as essentially a problem of individual psychology. In particular, no account was taken of the general character of the war neurotic's social relationships or of the underlying factors which determine it. Subsequent to the war of 1914-18, attempts were made, particularly under the influence of Freud's conceptions, to obtain a deeper understanding of the war neuroses; but the general tendency was to lay greater rather than less emphasis upon the individual nature of the war neurotic's emotional conflicts. This might have been otherwise if the line of thought pursued by Freud himself in his *Group Psychology and the Analysis of the Ego* had received more of the attention it deserved.

Among the various conclusions recorded by Freud in the work in question is one to the effect that the state of panic notoriously associated with the collapse of an army in the field is essentially due to a breakdown of the emotional bonds which unite members of the military group to one another under common leaders. According to the ordinary view, of course, it is when the situation of "every man for himself" arises that the group spirit (*esprit de corps*) disintegrates. According to Freud, on the contrary, it is when the group spirit becomes weakened that the situation of "every man for himself" arises and that panic invades the individual heart. It is thus not a case of the group spirit collapsing because the individuals who compose the group have given way to panic, but of panic assailing these individuals because, owing to the collapse of the group spirit, they have ceased to be members of a group. The essential feature of the situation is that each quondam member of the group becomes deprived of the support both of his former fellow-soldiers and of the military group as a whole, and is relegated to the status of an isolated individual facing the combined strength of a hostile force without any support. Confronted with such a perilous situation, it is small wonder if the soldier is assailed by panic. It is, of course, *mass* anxiety that Freud is here discussing; but those who have followed my argument will have little difficulty in recognizing that the phenomenon of panic to which he refers is essentially one of separation-anxiety affecting all (or nearly all) the members of a military group simultaneously. The panic-stricken condition of soldiers belonging to an army which has collapsed in the field must accordingly be regarded as one of transient war neurosis occurring under special conditions in individuals who are preponderantly "normal." The difference between the state of such soldiers and that of soldiers suffering from a frank war neurosis is then seen to lie in the fact that, whereas in the case of the "normal" soldier acute anxiety occurs only when the bonds uniting the group as a whole are dissolved, in the case of the neurotic soldier separation-anxiety may occur even when the bonds uniting the group as a whole remain intact. This means, of course, that the bonds uniting the neurotic soldier to the military group are unduly slender and precarious. They are slender and precarious because he has retained from his childhood an excessive degree of infantile dependence and has remained, at any rate at the deeper mental levels, so closely identified with his original love-objects within the family group that he is not capable of establishing any stable emotional relationship with the military group, or of participating adequately in that group spirit which is so indispensable to military efficiency and which is the essence of "morale."

That even the "normal" soldier may develop a war neurosis, albeit a transient one, in circumstances in which morale becomes impaired can leave us in no doubt regarding the intimate connexion of the question of morale and the question of the war neuroses. This phenomenon also serves to show that some measure of infantile dependence may be revealed even in the case of the most "normal" individual—the fact being that emotional maturity is never absolute, but always a matter of degree. In the light of what happens when an army collapses in the field we are further entitled to draw the conclusion that, whilst any high degree of infantile dependence is in itself inimical to morale, the existence of a high state of morale within a group can exercise a profound influence in counteracting the ill effects of infantile dependence among its members. In conformity with this view it has been strongly maintained by well-informed military opinion that during the war of 1914-18 the incidence of war neurosis varied between units in inverse proportion to their morale; and this opinion would appear to be capable of statistical verification even when allowance is made for the idiosyncrasies of regimental medical officers. The incidence of the war neuroses in an army may thus be regarded as a criterion of morale.

The Real Significance of War Neuroses

Reference has already been made to the view, widely held by psychotherapists during the last war, that the war neuroses derived their significance from the fact that their symptoms provided the affected soldier with an unconsciously motivated means of escaping from the dangers of the battlefield with a good conscience. The limitations of this view at once become obvious when we consider that many soldiers contract typical war neuroses without ever having been near a battlefield, and even in the absence of any great prospect of being near one. Actually, as I have tried to show, it is to the symptom of separation-anxiety that we must look for the real significance of the war neuroses. It is towards a return to his home and his loved ones, rather than towards an escape from the dangers of the battlefield, that the neurotic soldier is orientated. At the same time the older view just mentioned does embody an observation which, when properly interpreted, is certainly of great significance. This is the observation that the neurotic soldier characteristically displays a remarkable absence of guilt over his evasion of military duties. Such an absence of guilt is not invariable; for in a proportion of cases with depressive and obsessional features there is a definite tendency on the part of the patient to worry over letting his country or his unit down. Even in such instances, however, one usually gains the impression that the individuals concerned have actually given up all real effort, and that their apparent scruples amount to little more than lip-service to abandoned standards of the past. Further, in so far as such self-reproach is genuine, it is only in the prodromal stage of the war neurosis that it assumes an acute form—i.e., in the stage at which there is real conflict between the desire to return home and the sense of duty. This is usually before the individual reports sick; for by the time such individuals report sick the issue of the conflict is already almost invariably decided. With the exception of these cases, however, neurotic soldiers display a remarkable absence of self-reproach over the failure in military duty involved in their neuroses. This holds true not only of conscripts who have perhaps entered military service with reluctance but also of volunteers who have joined the Army out of patriotic motives.

It is evident, therefore, that the war neuroses are characterized not only by separation-anxiety but also by a definite deterioration of the sense of duty—i.e., by a definite disintegration of the mental structure of conscience. An unmistakable disturbance of the personality is thus seen to be involved in the development of a war neurosis. This disturbance is part and parcel of the regression involved in that revival of a hidden state of infantile dependence to which, as we have seen, a war neurosis is to be ultimately ascribed. What happens is that the war neurotic regresses, in greater or lesser degree, to an infantile level corresponding to a stage of development at which the structure of conscience has not yet been organized upon a stable basis. The neurotic soldier is thus more or less reduced to the emotional state of a child who has not yet reached the stage of accepting his parents as authoritative conscience-figures. At this stage the child is not so much concerned whether his own behaviour is good or bad (morally) in the eyes of his parents as whether his parents appear to love him or not—i.e., whether, from his point of view, they present themselves to him as good (in the sense of "nice") or bad (in the sense of "nasty") figures. What happens, therefore, when a soldier develops a war neurosis is that, regressing to an infantile emotional level, he ceases to regard his superiors in rank and the military organization in general as authoritative parental figures to whom he is bound by a deep sense of moral obligation, and begins to regard them as "bad" parental figures who have no love or consideration for him. At the same time he identifies those at home with "good" parental figures who love him, and who will look after him if only he can get back to them (distance often lending no little enchantment to the view). He thus becomes consumed by an overwhelming desire to escape from the insecurity which he experiences at the hands of the "bad" figures, into whose clutches he feels that military obligations have delivered him, to the security which the "good" figures at home seem, by contrast, to offer him.

That this is a correct interpretation of the situation which develops is confirmed in an interesting manner by two of the stock complaints voiced by neurotic soldiers in proof of their inability to "go back" to the Army. These are (in all cases almost identically phrased): "I can't stand being shouted at," and "I can't eat Army food"—the latter complaint being almost invariably followed in the case of married men by the remark, "But I can eat anything my wife cooks for me." The inner meaning of these complaints is, of course, that every word of command has become the shout of an angry father, and that every "greasy" (always "greasy") meal from the cookhouse has become additional evidence of the indifference of a heartless mother. Further evidence that the neurotic soldier feels himself to be in the power of evil figures is provided by the frequency of such symptoms as a sense of being watched, as well as by the frequency of nightmares about being chased or shouted at (not to mention somewhat less common nightmares about being crushed, strangled, or visited by ghosts). Such being the situation, it is not difficult to understand why it is that the war neuroses should prove so resistant to psychotherapy—and indeed to any form of remedial treatment in the medical armamentarium. Perhaps it is small wonder too that, after acquiring some disillusioning experience of neurotic Service men *en masse*, I was driven to remark, "What these people really need is not a psychotherapist, but an evangelist." In the light of further experience I see no reason to think that this remark was greatly in error; for I remain convinced that, from the national standpoint and from the standpoint of military efficiency, the problem presented by the war neuroses is not one of psychotherapy but one of morale.

I desire to acknowledge my indebtedness to the Department of Health for Scotland for permission to publish this paper, in so far as it is based on my experience as Visiting Psychiatrist in the Emergency Medical Service.

The report for 1941 of the South African Institute for Medical Research records expansion in all branches of its work to meet the needs of war. The training of medical men and technicians for military laboratories continued, seven courses being given: three for technicians in general field laboratory work, two for officers in general pathology, and two for officers in blood transfusion. An investigation was made into the possibilities of extracting vitamin C from natural sources available in the Union. Fresh guavas were found to be by far the richest source, equal, if not superior, to rose-hips in Europe. The skin and outer pulp yielded the most ascorbic acid, and fruit gathered immediately before it was fully ripe showed the maximum vitamin content and the greatest stability of the vitamin during storage. In a series of canning experiments under actual factory conditions some modifications of standard procedure were found to be desirable—namely, the selection of fruit at the correct stage of maturity, the retention of the skin, and the removal of seeds. The dried fruit was also investigated, and it was found that if the fruit was first blanched a powder containing 3 to 4.5% of vitamin C could be produced. From this powder guava sweets were prepared, each containing the required daily dose of ascorbic acid. Provided the preliminary drying had been thorough these sweets, wrapped in dark transparent paper and packed in pliofilm, withstood six weeks' incubation at 110° F. without appreciable loss of ascorbic acid or any deterioration in flavour, colour, or palatability.

ABORTUS FEVER

BY

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Brucella abortus infection in cattle is very common. No doubt a good farmer eradicates known cases from his herd, but I have been told that it is an accepted practice in dairy-farming districts to send infected animals to the sales. The danger of infection to man is from mastitis in the cow, when Brucella is conveyed in the milk or through an abrasion in the hand of a farm worker. The disease is not notifiable, and it is difficult to estimate its incidence; since its symptoms are often trivial, very variable, and never distinctive, diagnosis depends almost entirely on the agglutination test, and there seems little doubt that the true incidence is several times that of the recognized cases. Subclinical infection is probably very common. Huddleson (1939) refers to a study in school children which disclosed a significant agglutination titre in 40% after all had drunk infected milk, when only two of the children developed symptoms of the disease; agglutination titres in symptomless subjects rose as high as 1 : 12,000, and many had titres of 1 : 320. These children were observed over a period of more than a year, and the development of maximum agglutination was often a matter of months. Wilson (1942) estimates that 500 cases per annum occur in England and Wales.

Human cases of the disease were not recognized for many years after it was known that infection in cattle was common; mortality is low, and the disease does not appear to be a cause of abortion in women, for more than one case has been observed in an undisturbed pregnancy. The number of Brucella in infected cows' milk is far less than of *Br. melitensis* in goats' milk, and this may account for the relative mildness of abortus fever as compared with undulant fever. The two organisms can only be distinguished serologically, and the clinical course of the infection is very similar.

The general picture of the disease is that of an insidious onset (with uncertain but probably long incubation), a prolonged course of anything up to several months but usually some weeks, with limb pains and sweating as the prominent symptoms, an undulant type of fever, leucopenia, and negligible (possibly no essential) mortality. This is a true account of many cases, making a picture easily kept in mind, and if the blood of every patient presenting it were examined for *Br. abortus* agglutinins the great majority of cases would probably be diagnosed. One might perhaps question the need for laying stress on the importance of correctly diagnosing a disease which is essentially not fatal, which causes no lasting disability, and which is very possibly not amenable to any specific treatment. The importance is twofold: (1) the infection is a cause of a good deal of prolonged invalidism, and if there is no recognition of its prevalence there will be the less energetic search for a cure and for measures to eradicate it; (2) a true diagnosis will often serve greatly to relieve the mind of patient and doctor, and may prevent a long-continued enforced period of medical observation and inactivity for suspected tuberculosis. Abortus fever is a more likely diagnosis than tuberculosis in patients who have sweating as the presenting symptom.

Quite a high proportion of abortus fever cases, however, have bizarre symptoms, and these may present in such a way as to make diagnosis most difficult. Huddleson thinks that "latent" infection may become evident after some intercurrent, perhaps trivial, illness; on the other hand, in one of my cases the onset of the fever was the signal for the development of a streptococcal endocarditis. It seems worth while to give an account of 8 cases which I saw between June, 1938, and June, 1942, because of the extraordinary diversity of their symptoms: so much is this diversity impressed upon one by even such a limited experience of the disease that the diagnosis is automatically considered in every case of fever unexplained after a few days. In the central laboratory of the area an agglutination for *Br. abortus* is included in every Widal reaction.

The endemic nature of the infection is shown by the time of onset of these 8 cases from one area:

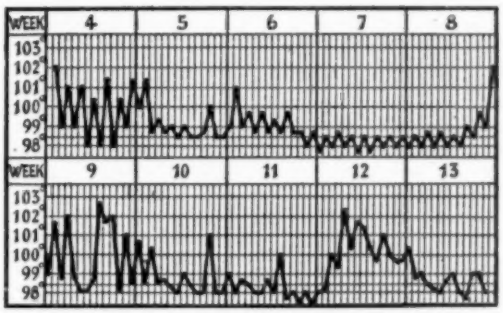
1938		1939			1940				1941			1942	
	1			1	1	1			1	1	1		1

Only one case had direct contact with cows: the others were therefore all due to infected milk. The provisional diagnoses before the finding of positive agglutination were: typhoid (1), pyelitis (1), pulmonary tuberculosis (1), meningitis (2), bronchitis (1), neurosis (1), rheumatism (1)—i.e., in no case was a correct diagnosis made immediately, and most of the patients had been ill for some weeks before the diagnosis was proved.

Case 1: Typical Undulant Fever with Psychosis

A married woman, aged 49, with a lifelong history of psychosomatic symptoms. First seen Jan. 3, 1942. Diagnosis of abortus fever on Nov. 16, 1941, when agglutination titre was 1 : 1,600. History then about 3 weeks, and symptoms: constipation, rigors, sweating, limb pains, and exhaustion. Two attempts to give sustained treatment with a sulphonamide abandoned for lack of co-operation. Three undulations of fever (see Chart).

Condition of Patient in the Eighth or Ninth Week of Illness.—Apathetic, querulous, and discontented. Complete insight into her condition. No lack of emotional control at this stage. Required trained nursing at home and made life difficult for the nurse. Attempted to supervise affairs of house and family. Physical condition good, but tongue dry; fairly heavy sweating, almost entirely at night. No pain on movement of limbs. No albuminuria and no physical signs found in nervous system; no enlargement of liver or spleen. Differential cell count on Dec. 30, 1941: P. 66, L. 29, M. 3, B. 1, E. 0.5%. Blood count on Jan. 6, 1942: R.B.C. 4,170,000, Hb 77%, C.I. 0.92, W.B.C. 6,150 (P. 58, L. 40, M. 2). She found it difficult to sleep, and had been given both bromide and barbiturate; a slight tendency to disorientation and to aphasia and to agraphia, which was evident as hesitation in the finding of words, was attributed at this time to the effects of the barbiturate.



Temperature chart of Case I (4th to 13th weeks), showing three undulations of fever

She resisted admission to hospital until Jan. 25, by which time both her physical and her mental condition had deteriorated. She had lost weight and refused food. Her attitude to doctors and nurses was critical and resentful, but there was still complete insight and she was quite prepared to accept the fact that her depression and irritability were the result of her illness. The periods of depression did not correspond with periods of temperature. After admission she had an irregular pyrexia, one definite relapse of the undulant type from Jan. 20 to 27, and thereafter no significant rise of temperature. A little later she developed lack of emotional control and strong paranoid tendencies.

On admission to the Royal Northern Infirmary (Jan. 25) agglutination to *Br. abortus* was 1 : 16,000. An estimate of blood bromide was made on the suspicion that her depression might be due to bromide poisoning, and was 250 mg./100 c.cm. Complete withdrawal of bromide, however, made no impression on the emotional state. There was intermittent albuminuria and the urine sometimes showed pus cells. Her blood culture on Jan. 22 was sterile. The blood count showed a deterioration, and on March 3 was: R.B.C. 2,880,000, Hb 59%, C.I. 1.0.

Comment.—The symptoms in this patient were essentially psychotic, and consisted of depression, apathy, lack of emotional control, slight tendency to aphasia and agraphia, irritability, and suspicion. Throughout there was complete insight into her state

This case can hardly be regarded as a chronic one, because 5 months after the onset she was restored to her usual health. It is notable that the agglutination increased from 1 : 1,600 to 1 : 16,000 between the third and eighth weeks of the illness. There was no notable leucopenia. Sulphonamides were not used effectively because of lack of co-operation, but short trials of 6 g. daily of (*a*) sulphanilamide, (*b*) sulphapyridine, and (*c*) sulphathiazole had no influence on the temperature.

Case II: Bronchitis with Steatorrhoea: ? Pancreatitis: Intermittent Albuminuria

A rigger in the R.A.F. aged 37. History of recurrent bronchitis for 10 years. Was admitted to a military hospital on Feb. 13, 1940, with cough and sweating, present for some weeks. The onset of this attack was described as influenza. Transferred to Royal Northern Infirmary Feb. 22. Febrile; signs of bronchitis. Treatment with sulphapyridine begun, but discontinued because of persistent nausea and subsidence of temperature. Inconstant albuminuria; centrifuged urine contained red cells. Blood urea, 39 mg./100 c.cm. Standard urea clearance, 118% of normal. Blood culture sterile. From the first he complained of tenderness in the epigastrium and abdominal pain, and showed muscle spasm. Profuse sweats. Hb 75%, W.B.C. 13,000 (P. 69, L. 29, M. 2). Agglutination for *Br. abortus* positive 1: 8,000. Stools rather frequent, very pale. Total faecal fat, March 4, 44 g. % (60% split, 40% unsplit). Urinary diastase 50 units per c.cm., and total urinary diastase 62,500 units in 24 hours. March 18: total faecal fat 50.3 g. % (63.1% split, 36.9% unsplit). Serum bilirubin 0.4 mg./100 c.cm. By March 11 his symptoms had disappeared except for slight stiffness in the joints and for the signs of bronchitis.

Case III: Meningism, Pyuria, and Urticaria

A schoolgirl aged 11. Onset Nov. 1, 1940, with vertigo and stiff neck. Seen 3 days later by family doctor, who found nuchal rigidity. T. 101.8° F., P. 130. Spinal fluid normal. Given 6 g. of sulphanilamide daily for ? 3 days. Seen then by medical specialist, who found slight cyanosis, dilated pupils, diminished tendon-jerks, resistance to palpation of abdomen, furred tongue, and an urticarial rash. Urine showed pus cells, and diagnosis of pyelitis was made. Symptoms, however, continued. On Nov. 25 Widal reaction, because of continued temperature: agglutination to *Br. abortus* 1 : 480, negative to typhoid group. Blood culture sterile. Blood counts: Nov. 6—R.B.C. 5,100,000, Hb 83, C.I. 0.82, W.B.C. 3,500 (P. 43.5, L. 36.5, M. 19.5, B. 0.5); and on Nov. 7—W.B.C. 6,500 (P. 69, L. 20, M. 9.5, B. 0.5).

I saw her on Nov. 25: temperature still raised; sweating not excessive; pain in the back and hands and feet. No physical signs. Sulphanilamide 6 g. a day was given again, and was discontinued after 2 or 3 days: complete subsidence of symptoms, which did not recur.

Case IV: Bacterial Endocarditis

A hotel maid aged 19. Rheumatism at 13; established mitral disease. Seen in hotel July 31, 1939, 12 days after onset of an acute illness with delirium. No headache; no pains in limbs; no dysuria; no diarrhoea; no vomiting. Examination: Flushed; furred tongue; erythematous rash very suggestive of typhoid (about 20 small erythematous spots on trunk and limbs). Agglutination to the typhoid group negative, but positive to *Br. abortus* 1 : 3,000. She was admitted to the fever hospital; on admission, R.B.C. 3,970,000, Hb 68, C.I. 0.85, W.B.C. 7,350. No albuminuria. She was given sulphapyridine 6 g. daily, with short intermissions, for a period of 5 weeks. Temperature showed rises at irregular intervals of a few days and usually persisted for 24 hours; occasionally febrile periods would last 3 days. Temperature never reached a higher level than 101° F. The temperature chart suggested a recrudescence of temperature whenever sulphapyridine was stopped. Erythematous rash reappeared on Oct. 5.

Transferred to Royal Northern Infirmary on Nov. 6, 1939: R.B.C. 2,360,000, Hb 34, C.I. 0.72, W.B.C. 14,150 (P. 77, L. 18, E. 1, M. 3.5). Platelets 123,610 per c.mm. Reticulocytes 2.5%. Blood film showed anisocytosis, poikilocytosis, and polychromasia. Examination: Very pale; furred tongue; tachycardia; B.P. 140/70; albuminuria—centrifuged deposit of urine showed red cells. Blood urea 135 mg./100 c.cm. No embolic phenomena apart from the kidneys. Agglutination to *Br. abortus* 1 : 120. Blood culture: *Str. viridans*. Further attempts were made to treat this patient with sulphapyridine and heparin, but she shortly afterwards died of uraemia. No necropsy was allowed.

Case V: Typical Mild Case with Sweating and Limb Pains

A labourer aged 20. Seen at Royal Northern Infirmary as out-patient on April 15, 1941. He had been off work for 4 weeks with "influenza." The symptoms were of limb pains, headache, and sweating. The sweats occurred about midnight, and he was referred to hospital because of the sweating. During the daytime he had no symptoms. Had not lost weight. Examination: A thin, nervous man with acne. No physical signs found. Sweats thought to be emotional, but blood sedimentation rate 7 mm. (Westergren), and agglutination to *Br. abortus* positive 1 : 8,000.

Case VI: Mild Case; Onset with Rigors

A bank clerk aged 25. Diagnosis here less certain than for the others. Admitted to Royal Northern Infirmary 2 weeks after onset of illness with slight rigor. An old case of pulmonary tuberculosis with maintained pneumothorax: last refill the day after onset of symptoms. Temperature raised from beginning of symptoms, and a week later pain in limbs and joints and headache, but no joint effusions. R.B.C. 4,350,000, Hb 73, C.I. 0.81, W.B.C. 7,950 (P. 76, L. 21, M. 3). Agglutination to *Br. abortus* negative on July 14, 1941; agglutination positive 1 : 120 on July 21, and positive 1 : 60 on July 27. B.S.R. on July 19, 21 mm. (Westergren). Blood culture sterile; stool culture negative. Treated with sulphathiazole, 1 g. 6-hourly; immediate subsidence of temperature and symptoms.

Case VII: Pleural Pain, Dyspnoea, and Tonsillitis

A soldier aged 44. Sent to hospital Oct. 3, 1939, as suspected case of pulmonary tuberculosis. Easily tired, breathless on exertion; nocturnal cough, pleural pain, sweating; sore throat one week before admission; no gastro-intestinal symptoms; no limb pains. Examination: Not severely ill; signs of bronchitis; no rash; sputum, no T.B.; B.S.R. 3 mm.; W.R. negative; W.B.C. 14,250 (P. 61.5, L. 30.5, M. 7). Agglutination to *Br. abortus* positive 1: 4,000. Treatment with sulphanilamide without any spectacular result, and symptoms still present on Nov. 19, 1939.

Case VIII: Meningism and Ocular Palsy

A farm servant aged 15. Admitted to hospital July 30, 1938, three weeks after onset of illness, with rigor, sweating, and exhaustion. Seen by doctor, but no diagnosis made. Improved. Returned to work for one week, when symptoms recurred with severe sweating and frontal headache. Intermittent diplopia from onset. Examination July 30: Flushed, sweating, dilated active pupils, normal fundi, slight nuchal spasm, and positive Kernig's sign. Left sixth nerve palsy. Spinal fluid twice examined; completely normal. Remained febrile for 3 weeks; symptoms and signs then gradually subsided. Sixth nerve weakness observed intermittently. No albuminuria. Agglutination to *Br abortus* positive 1 : 16,000 on Aug. 6, and positive 1 : 960 on Aug. 17. W.B.C. 6,350 (P. 55, L. 21, M. 20, E. 4). W.R. negative. Blood culture sterile on Aug. 12.

Comments

1. In none of these cases was enlargement of liver and spleen noted.

2. Anaemia was not a feature apart from intercurrent or pre-existing disease, nor did any case show an important loss of weight.

3. *Leucocytes.*—A considerable diminution in the polymorph count and in the monocyte count, without any proportionate increase in the lymphocytes, is considered characteristic of *Br. abortus*. Only one of these patients, however, showed any material reduction in the polymorphs (Case III; total polymorphs 1,505), but the next day this child's polymorph count had increased to 4,485. The monocyte count was certainly rather low in several cases, the lowest figure found being 122. One case (No. VIII) had a total monocyte count of 1,260, which is a high figure—so high, in fact, that mononucleosis was considered as a possible diagnosis, as also in Case III, in which the monocyte count was at one time 19.5%. The leucocyte counts are set out in the following table:

Leucocyte Counts

Case	Age	Total	P. (%)	L. (%)	M. (%)	E. (%)	B. (%)
I	49	6,150	58	40	2	—	—
II	37	13,000	69	29	2	—	—
III	11	3,500	43·5	36·5	19·5	—	0·5
		6,500	69	20	9·5	—	0·5
IV	19	7,350	—	—	—	—	—
V	20	—	—	—	—	—	—
VI	25	7,950	76	21	3	—	—
		10,700	65	32	3	—	—
VII	44	14,250	61·5	30·5	7	—	—
VIII	15	6,350	55	21	20	4	—

4. Blood cultures in 6 cases at various times, and several during the acute phase, were all sterile.

5. Blood sedimentation rate was estimated only 3 times. It was 7 mm. in Case V, 21 mm. in Case VI, 3 mm. in Case VII (Westergren 1 hour). One might perhaps suggest that high

rates are not found because of the absence of any massive inflammatory exudate.

6. *Skin Eruptions.*—Only 2 cases showed rashes which were considered to be due to the disease. Case III had an urticarial type of eruption, and Case IV in the early stages an eruption indistinguishable from typhoid, which was the original clinical diagnosis. According to Huddleson a typhoid-like eruption is frequent.

7. *Agglutination.*—Agglutination titres with the corresponding period of the disease are given below:

Agglutination Titres

Case I:	At 3 weeks, 1 : 1,600; at 12 weeks, 1 : 16,000
„ II:	At 7 weeks, 1 : 8,000
„ III:	At 4 weeks, 1 : 480
„ IV:	At 2 weeks, 1 : 3,000; at 5 months, 1 : 120
„ V:	At 4 weeks, 1 : 8,000
„ VI:	At 1 week, nil; at 2 weeks, 1 : 120; at 3 weeks, 1 : 60
„ VII:	At 4 weeks, 1 : 4,000
„ VIII:	At 4 weeks, 1 : 16,000; at 6 weeks, 1 : 960

It seems to be agreed that agglutination does not become positive until the second week, probably not until the tenth day from the onset of symptoms, and Huddleson says it may be negative right throughout a chronic case. The minimum diagnostic titre is a little difficult to determine. It will be noted from the above figures that there was no case with a titre less than 1:480, except Case VI, in which diagnosis, apart from the symptomatology, rested upon an increase in the agglutination titre from 0 to 120 during the first two weeks of illness; at the end of the third week it was found to be 1:60. It so happens that this was the only case in which a rather strong impression of the influence of sulphonamide treatment was gained. Harries and Mitman (1940) give 1:100 as the critical level, but consider that in London, where use of pasteurized milk is general and subclinical infections are less common, a titre of 1:80 is suspicious. This figure is also given by Wilson (1942) as significant. Huddleson gives 1:50 as the level for a presumptive diagnosis. Huddleson uses in diagnosis a skin-sensitivity test made from the products of a broth culture in a form which he calls "brucellergen," but the agglutination test seems to provide all that is required for a positive diagnosis.

8. *Unusual Symptoms.*—Meningism is reported by Huddleson as common in Malta. I have found no previous reference to it in abortus fever, nor any reference to ocular palsy. Cases of bacterial endocarditis are reported by Spink and Nelson (1939), who discuss the difficulties of diagnosis, and by Scott and Saphir (1928).

9. *Treatment.*—There is scanty evidence of any positive effects from the use of any special line of treatment. Huddleson claims a shortening of the infective period by the use of a vaccine. An antimony compound, stibophen (traded as "fouadin"), which is used in schistosomiasis, has been claimed as effective, but the positive evidence is slight (Neumann, 1936). An attempt was made to use this drug in one protracted case, but the appearance of albuminuria after the first dose prevented any further administration. There have been no dramatic or even very encouraging results reported with any of the sulphonamide compounds. All except one of the 8 patients here reported were given a sulphonamide, but without any obvious effect. Sulphapyridine was used in 2 patients, sulphanilamide in 4, and sulphathiazole in 1. In Case VI there was an abrupt termination of symptoms after the use of sulphathiazole; such a mild case, however, is clearly not enough to warrant any definite conclusion.

Summary

A description is given of 8 cases of abortus fever, which is endemic in this country. The disease is benign, but gives rise to great difficulties in clinical diagnosis, and it may be the starting-point of more serious disease. Since milk is almost entirely the source of infection, universal pasteurization would eradicate it. The agglutination test is conclusive in diagnosis.

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FOOT-AND-MOUTH DISEASE IN MAN

BY

HENRYK DLUGOSZ, M.D.

With each new epizootic of foot-and-mouth disease (f.a.m.d.) we must consider whether infection of man is possible, and, if so, is it of practical importance? That infection may occur is instanced by the experimental infection of French scientists through drinking infected milk; by similar results among workers in the German research centre on the island of Rügen; and, finally, by positive results obtained in guinea-pig inoculation from certain cases of f.a.m.d. (aphthous fever) in man which have been described in medical journals.

Infection of man is therefore possible, and, although occurrence is rare and characterized by persistent mildness, we consider it to be of no little scientific interest. The rarity of the disease in man (we know of only ten cases prior to the last war, as opposed to many thousands of cases in animals), and its mildness, do not deprive it of interest, as the slightly affected man may start a serious outbreak among valuable live stock. As the disease causes cattle to lose weight and their milk production is lowered the condition is of paramount importance to farmers and exporters. To-day especially, when the need for maximum food production is a major consideration, the early diagnosis of all cases is essential, if only from the purely economic point of view.

I have had the opportunity of observing two cases of f.a.m.d. in man. The first I studied in detail in Poland, in the University Clinic of Lwow. This has been described in *Polska Gazeta Lekarska* (1938, **17**, 501). The second case, that of a Polish soldier, was brought to my notice in Scotland in September, 1940.

Case I

A man aged 40 was wounded in the finger by a splinter from a butcher's table. The wound, although slight, healed very slowly. A transitory lymphangitis and lymphadenitis followed in a few days in the affected arm. Two weeks later general weakness, headache, and febrile manifestations developed, the temperature rising in a few hours to 102° F. These symptoms persisted for three days, the patient believing himself to be suffering from "influenza." On the third day painful mastication and salivation ensued; multiple vesicles appeared in the mouth, later giving way to ulcer formation. The following day the ulcerations were found to be larger, and were bleeding. The doctor, reconsidering his original diagnosis of "aphthous stomatitis," suspected an acute leukaemia or agranulocytosis. Blood examination, however, revealed no abnormality. Within the next few days the temperature had risen to 105° F., the mouth symptoms had increased, and the skin around the mouth showed areas of pustulation. The patient at this stage was sent to the University Clinic.

On my examination (at the end of the first week of the illness) I found the temperature to be 103° F., while excessive salivation was a prominent feature. On the skin around the mouth there were vesicles filled with a serous turbid fluid. Some of these were covered with crusts. Multiple vesicles and small polycyclic ulcers with grey bases were found over the inner sides of lips, cheeks, and palate, the surfaces of the tongue, and on the pharynx. There was slight bleeding from the ulcerating surfaces, and the breath was very foul.

The characteristic sweetish-mouldy smell of the patient reminded me of the smell I once sensed near a cow with foot-and-mouth disease. This smell facilitated the diagnosis. On the skin of the trunk there was a group of vesicles resembling herpes zoster. Large erythemata of cherry-red colour were present on the palms, while on the soles there were single polycyclic spots of similar coloration.

On the tenth day the mouth lesions began to heal, but on the palms and around the finger-nails large vesicles appeared. Vesicles appeared also on the soles, but these remained single. During the next few days the mouth lesions had healed, but the vesicles on hands and feet persisted. By the third week of the illness the ulcers of the mouth had healed without cicatrization, and the perioral lesions had disappeared. Finally the vesicles on the hands and feet healed after separation of the epidermis, leaving no cicatrices. There were no sequelae or complications, the temperature gradually returning to normal after the appearance of the vesicles.

Blood examination during the illness revealed no abnormality, but a lymphocytosis was present during convalescence. The red cell

sedimentation rate (Westergren–Biernacki) was never above 8 mm. an hour. The Wassermann reaction of the serum was negative. Guinea-pigs inoculated with the serous fluid from the soles and palms developed the typical signs and symptoms of f.a.m.d. after 12 to 14 days.

The Veterinary Office at my request undertook a search for cases of f.a.m.d. in the patient's district, and were successful in locating several cases among cattle. The diagnosis of the disease in man was therefore instrumental in bringing to light unsuspected cases in animals in the same locality.

Case II

A Polish soldier, aged 31 and of previous good health, reported sick on account of vesicles on his hands which made work impossible. He gave a history of general weakness of 14 days' duration. Twelve days previously he had been troubled by vesicles in the mouth and on the inner surface of his lips, which he attributed to burns from hot food. Vesicles had been present on his hands for seven days before reporting. Large quantities of unboiled milk formed part of his normal diet. Examination revealed ulcerated areas on the tongue and inner surface of cheeks and lips. Vesicles with crusts were present round his mouth; while the palms, fingers, and soles showed areas of vesiculation. His temperature was 98.6° F. A diagnosis of f.a.m.d. was made on these findings, and the patient was sent to hospital in Glasgow owing to the proximity of pasturage to the camp.

Commentary

These two cases may serve to show the occurrence of f.a.m.d. in man. Infection may be external, as evidenced by the first case and by the work of experimenters, or via the digestive system as in Case II and in the French researches. The incubation period is apparently about 14 days.

Characteristic findings are the headache and general weakness, and pain in the extremities. About the third day excessive salivation and superficial ulceration of the oral mucous membrane and vesiculation of the skin around the mouth ensue. Later the vesicles appear on the palms and soles and around the nails, being preceded by cherry-coloured erythema. The vesicles contain a turbid serous fluid. All the skin and mucous membrane lesions heal without cicatrization. The temperature is high at first and falls after the appearance of the vesicles, returning to normal by the second week. In a few cases the temperature remains normal throughout. No changes are apparent in any of the internal organs, in the blood, or in the sedimentation rate (an important point in the differential diagnosis of acute leukaemia and agranulocytosis). The disease appears to run a more moderate course in man than in animals.

Differential diagnosis must include aphthous stomatitis, acute leukaemia, agranulocytosis, scurvy, and drug rashes. The distribution of the lesions, blood examination, and guinea-pig inoculation will aid diagnosis. Treatment is purely symptomatic.

Taking into account the appearance of two such cases in my own experience in so short a time, I am in some doubt as to whether f.a.m.d. is as rare in man as I had hitherto believed. Owing to the comparative mildness of the constitutional upset many cases may never come to the notice of the medical man, and not a few cases may be wrongly diagnosed.

Conclusions

The sanitary authorities would be well repaid if more attention were given to the prevention of the spread of f.a.m.d. by man.

There should be co-operation between the doctor and the veterinary worker to prevent human sufferers with f.a.m.d. from having contact with animals.

A new sterilization decree has been issued in Norway by Quisling aimed at "inhibiting the reproductive capacity of mentally or physically defective persons whose children might suffer from the same weaknesses, and of insane or mentally defective people who have abnormally developed sexual impulses and might commit sexual offences." Doctors, prison and hospital officials, police, and social welfare institutions may propose an investigation with a view to sterilization, and decisions will be taken by the Director of Public Health alone. Under the law passed in 1934, the Director of Public Health could decide on cases only after they had been considered by a special board appointed by the public health department.

PREGNANCY AND LABOUR IN A CASE OF CONGENITAL COARCTATION OF THE AORTA

BY

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Congenital coarctation of the aorta, being a somewhat rare abnormality and moreover affecting males more often than females, in the proportion of 3 to 1, is seldom seen as an obstetrical complication. Jensen (1938), reviewing the literature, found references to child-bearing in 7 cases of coarctation, the most important account being that of Strayhorn (1936), whose patient showed signs of commencing cardiac decompensation during pregnancy, but was rested and successfully delivered by Caesarean section. Of these 7 patients, two died during pregnancy—one from cerebral haemorrhage, the other from rupture of the aorta into the pericardium; a third died from congestive heart failure 14 days after pregnancy had been terminated. In addition to the foregoing, Bramwell and Longson (1938) give details of a case in which there was dyspnoea and palpitation on exertion from the fourth month onwards; this patient was successfully delivered by Caesarean section, and made an excellent recovery.

Case History

Mrs. A., a farmer's wife, had suffered from tiredness and sudden fainting fits from the age of 8, could not indulge in games, and had to leave school early. She was diagnosed at the age of 20 as a case of congenital coarctation. At this time she was incapable of exertion, and had had her activity greatly restricted for several years; but she became stronger, married, and in the autumn of 1941 became pregnant for the first time, being then 31 years old.

On Nov. 5, when I first saw the patient, she was in the second month of pregnancy and looked well. On examination scoliosis was seen to be pronounced: the heart showed displacement and enlargement to the left, the apex beat being at a level with the lower border of the manubrium sterni and axillary in position, being 6 in. from the midline. A harsh systolic murmur was heard in the second and third intercostal spaces to the left of the sternum, and extending towards the apex: the second sound in this area was sharp and reduplicated. At the apex the first sound was loud and accompanied by a systolic murmur, and the second sound was sharp. The pulse rate was 72, and the blood pressure in the arm 210/100. The blood pressure in the leg was difficult to obtain, but appeared to be about 125 (systolic). Arterial pulsation was marked above the clavicles, but not elsewhere. A radiograph of the heart was similar to one taken 10 years earlier, except that the left border of the heart appeared straighter and the apex almost at the left border of the chest (1/2 in. further to the left than 10 years before): typical rib-notching was present. Apart from left axis deviation there were no abnormal appearances in an electrocardiogram. The pregnant uterus presented no unusual features, the pelvis was of good size, and the urine was normal.

The patient remained extremely well throughout pregnancy, doing her own housework, taking walking exercise, and retiring to bed at 7.30 p.m. Her doctor found no cardiac, arterial, or urinary changes throughout, but on examining her 5 weeks before term he found premature labour to be starting, and she was admitted to hospital.

On admission the patient was seen by a surgical colleague (Mr. B. G. Scholefield), who had seen her in early pregnancy also: he agreed to the continuance of labour, but was ready to perform Caesarean section should this appear advisable. The progress of labour was very gradual, mild pains with 10 to 15 minutes' intervals continuing throughout the day. The patient was given a night's sleep (morphine gr. 1/4, atropine gr. 1/100), and labour continued the next day, dilatation of the os proceeding gradually without producing distress. The blood-pressure reading was unaltered by these pains, though some frontal headache was complained of after 11 p.m., the os being by then almost fully dilated. The change to second-stage pains was dramatic and alarming. These set in with rupture of the membranes, and the patient immediately became acutely distressed and breathless, and complained of severe headache. Pulsation of expansile appearance became pronounced at the root of the neck; the pulse rate was 128. Unfortunately it

was impossible to delay to obtain a blood-pressure reading. The patient was at once anaesthetized, and at midnight was delivered by forceps of a living premature child of 5 lb. Convalescence was uneventful, and a radiograph of the heart and an electrocardiogram taken before discharge from hospital three weeks later showed no alterations from those taken in early pregnancy.

Comment

The decision to allow labour to continue rather than have early recourse to Caesarean section was prompted by the following considerations: the patient felt strong and well, was calm and confident, and was anxious to make the attempt; the infant was small and its presentation normal (L.O.A.), so that its passage might reasonably be expected to be an easy one; the early progress of cervical dilatation was free from fatigue and cardiac distress. In spite of these favourable circumstances the labour had to be stopped as soon as second-stage pains set in, as it was obvious that the tension in the upper circulation was being dangerously raised. With a full-time child, a less favourable presentation, a maternal heart having less reserve, or in the presence of more distressing first-stage pains, the danger-point might well be reached before dilatation was complete and delivery possible. This being so, it would appear that in cases of coarctation of the aorta, however favourable, the obstetrical procedure of choice is Caesarean section at the onset of labour.

My thanks are due to Dr. P. King Lewis for permission to publish this case, and for his share in its management.

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Medical Memoranda

A Case of Anaphylaxis after Anaesthesia

There has been a general tendency in the last 10 years to perform an increasing number of operations under local anaesthesia, and this tendency has been given an added impetus by the war. Local anaesthetics are cheap, convenient, portable, perhaps require no special training, and are more economical of man-power. It is therefore essential to know something of their relative toxicity.

Toxicity may be due to (*a*) rapid absorption, (*b*) idiosyncrasy, and (*c*) accidental injection into a vein. This last can usually be prevented by suction through the syringe, when the presence of blood is shown in the solution. This means that the needle must be removed and reinserted elsewhere.

In 217 cases of "conduction anaesthesia" with novutox* I have met with only one untoward incident. Novutox is the proprietary name for the preparation of 2% w/v solution of ethocaine hydrochloride with adrenaline 0.00002 g. per c.cm. in Ringer's solution with caprylhydrocupreinotoxin HCl in a proportion of 0.00002 g. per c.cm. and thymol 0.0004 g. per c.cm.

CASE HISTORY

The patient, a quite healthy individual, complained of severe muscular pain and was given an intramuscular injection of 0.75 c.cm. of novutox in the right flank, the area of maximum tenderness. Ten minutes later he had a severe itch in both arms, pain and dryness of the gums, thirst, and lacrimation. There was shivering, and the eyes became red; the nostrils were blocked, the voice became hoarse, and he was troubled with a severe throbbing pain in the head and frontal sinuses. The face, neck, and hands were livid and unbearably hot. His systolic B.P. was 210, the pulse 115 per minute, and the temperature 105°. He became speechless and dyspnoeic.

The patient's clothes were loosened, and the windows in the room widely opened. He was thoroughly mopped with a wet Turkish towel, which after each application to his face became hot and steaming. After 20 minutes he received 6 drachms of brandy without any effect. Tincture of spirit of ammonia was then given to inhale: this partially cleared the nasal and bronchial passages. In about 45 minutes from the outset he began to speak incoherently in a muffled nasal way. Respiration, though easier, was still laboured, and he now felt cold and shivering. He was at once given a hypodermic injection of two minims of adrenaline hydrochloride, and in exactly 10 minutes was able to dress himself, and his B.P. came down to 180 mm. Hg, the pulse to 84, and the temperature to 99.5°. In another 10 minutes he took a cup of tea and felt much better.

He travelled in a public conveyance home, where I visited him the next day. He was pale but in good humour, joked about his experience, and said that he thought he was going to pass out.

R. ARMATTOE, L.R.C.P.&S.Ed.

* Novutox does not contain cocaine, is not on the D.D.A., and is five times less toxic than cocaine.

Reviews

NEPHRITIS

Nephritis. By Leopold Lichtwitz, M.D. (Pp. 328. 25s.) London: William Heinemann. 1942.

Prof. Lichtwitz, who is now in New York and who is well known for his many contributions in the past to the German literature of kidney disease, has recently given English workers the benefit of his experience in a short readable volume. A large part of the book is devoted to discussions on the physiology and functional pathology of renal disease, including such conditions as water metabolism, albuminuria, oedema, and uraemia. He describes the method of testing the function and capacity of the kidney which has been in use in his clinics for many years. This, in its simplest form, merely consists of an estimation of the excretion of solid substances by measurement of specific gravity and urinary volume under standard conditions. It can thus be carried out by any clinician without expert laboratory assistance. Further information can be gained by studying the excretion of chloride and urea over a period while the patient is on a special diet designed to test his excretory capacity. This section, the more physiological, is undoubtedly the best in the book, which, however, regarded as a textbook on nephritis, is rather disappointing. The author follows, on the whole, the German school, and his references are very largely of German origin. The more recent work of English and American authors is given scanty consideration or, in some cases, none at all. This is especially regrettable as the work of Goldblatt on hypertension and the recent writings of Ellis and Wilson in this country have done so much to clarify a difficult chapter in medicine.

Lichtwitz does not attempt any satisfactory classification of kidney disease. He deals only briefly with essential hypertension, but does not stress the importance of the malignant type. Even if he holds that this is not primarily a disease of the kidney, it is surely of the greatest importance in differential diagnosis. His consideration of uraemia, again, rather takes us back to the days when there was no clear distinction between true chemical uraemia and many similar symptoms which are caused by acute or chronic states of hypertension. The book is well worth reading by anyone particularly interested in renal disease, as it gives a new viewpoint on many aspects of the subject, and brings the English reader an easy summary of Continental literature. It cannot, however, be considered a comprehensive or even an up-to-date statement of present-day views on nephritis.

HUMAN NUTRITION

Food and Planning. By J. R. Marrack, M.D., D.S.O., *M.C.* With a preface by Sir John Boyd Orr, D.S.O., *M.C.* (Pp. 285. 15s.) London: Victor Gollancz, Ltd. 1942.

This admirable book is about to appear, we understand, in a second printing; therein doubtless several minor printer's errors will have received attention. The chief, if not the only serious, defect of the first edition will also, it is hoped, be put right. It is obvious from internal evidence that a very long time must have elapsed—long, anyhow, in relation to the rapidly changing circumstances of to-day—between the author's completion of his manuscript and the publication of the book. Thus, Table I contains no analytical data for national bread (only for white and for wholemeal), while banana and orange are both included in that table. It is also a pity when publishers, expert in catering for their own general or specialized publics, should presume to knowledge about the requirements of other publics, and then show themselves lacking in this knowledge; the publications of the Left Book Club or of Miss Dorothy Sayers can generally, if not always, dispense with an index, but its removal from Prof. Marrack's manuscript (wherein he must certainly have included it) has almost fatally affected the book's permanent utility, especially as it covers the whole of the very wide field over which those interested in human nutrition must to-day cast their eyes. Prof. Marrack ranges easily and lucidly from the structural formulae of pure vitamins to the less obvious implications

of food control, from the conditions that produce deficiency diseases to the planning of agriculture in the post-war world.

Everywhere the author's common sense—sometimes, moreover, expressed with an attractive pungency—makes itself felt. This is a book that will be enthusiastically welcomed by the level-headed reformer and even by the intelligent revolutionary, but will give poor comfort to the food crank or to the defeatist. Prof. Marrack knows what we all need, and shows how it can be got; he does this, however, without in any way minimizing the difficulties that may have to be overcome.

The book begins with a chapter that constitutes a general introduction to the physiology of nutrition—so excellent an exposition as to make unjustifiable the continued publication of many of the numerous cheap booklets in which predigested nutritional science is gingerly dropped into the intellectual mouths of John (and Jane) Citizen by our more dietetic-minded guides, philosophers, and friends. The author's next two chapters are on food requirements and the effect of deficiencies on growth. The first chapter and these two might well be reprinted separately as the "Intelligent Woman's Guide to Social Feeding." The addition of Chapter IV, in which the nutritive value of different foods is considered in detail, would provide her with practically everything she need know about the principles of a scientifically based diet, whether for herself in pregnancy and lactation, the newborn infant, the growing family, the wage-earner, the school dining-room, the factory canteen, or the British Restaurant.

The next part of Prof. Marrack's book surveys what people actually eat (Chapter V) and the relation between health and the food that different groups have been found to consume (Chapter VI). The remaining six chapters contain, among other things, a most interesting survey of rationing during the last war, and may remind many readers of things that they have forgotten—perhaps subconsciously urged to this forgetfulness—of which they would be glad to be reminded when considering the problems of this war and its sequelae. There are, further, two chapters concerned particularly with war problems—one on war and health and the other on planning during scarcity—as well as an examination, in so far as available data permit, of the present position in Britain, Germany, and some other countries. Finally, Prof. Marrack has given us his views on the changes that will be needed if we are truly to plan for plenty; he is clearly of the opinion that this must involve restrictions both of national sovereignty and of private enterprise, especially of the latter, though the two cannot be separated.

It would be unfair, because misleading, to refer to the small number of *obiter dicta* that seem to call for some qualification. Any book of as wide a range, written with an equally genuine sincerity and tempered anxiety, must furnish examples of such casual comments. Perhaps, however, one may be permitted once more to point out the unfair implication usually conveyed by authors who refer to rickets as "the English disease." Prof. Marrack is among those who have managed to give the impression that this phrase was coined on the Continent because the condition was characteristic of these islands, whereas it was, in fact, so called because Glisson gave the first complete description. It was in honour of British medicine, not as a reproach to our climate or diet, that rickets got its association with this country. Again, the implication of a remark on p. 71 is that all dried milks, because they have been dried, require an antiscorbutic supplement for infant feeding. The truth, of course, is that all cows' milk (and many breast milks) should be so supplemented, whether raw, pasteurized, boiled, condensed, evaporated, or dried. On the other hand, one cannot write too strongly in support of Prof. Marrack's wise words about the so-called "protective" foods: his remarks are well worth quoting.

"There has sprung up also a kind of snobbish attitude to foods, which are divided into an aristocracy of 'protective foods,' a middle class of 'body-builders,' and a lower class of 'workers and warmers.' In the first place, it is rather absurd to regard foods that supply vitamins as specially 'protective.' A man will die in a few days if deprived of water, and in a few weeks without any food, but can last for months without protein or vitamins. As far as 'protection' goes, water comes first, calories second, vitamins and proteins also run. And what foods, apart from sugar and perhaps unfortified margarine, do not contribute some vitamin or body-building substance?"

From among the growing pile of books under which the bookshelves and desk of the nutritional reviewer are slowly being submerged there is none that provides a more level-headed view of the present position or a saner appraisement of the problems lying in wait for those who wish to go forward on the basis of "sufficiency for all before abundance for some."

NEUROSURGERY

The Principles of Neurological Surgery. By Loyal Davis, M.S., M.D., Ph.D., D.Sc. Second edition, thoroughly revised. (Pp. 503. 35s.) London: Henry Kimpton. 1942.

The author modestly claims that this book places before the practitioner the possibilities of neurosurgery, leaving out technical detail and the intricacies of neurological theory, but drawing attention to the chance of therapeutic relief in many conditions which formerly have been considered hopeless. Actually it achieves much more than this, for in the wide field it covers it sets forth a well-balanced summary of the majority opinion of neurosurgeons at the present day.

It is intended principally for the general practitioner and the undergraduate student, but we suspect that the latter may find it difficult to distinguish between matters of primary and secondary importance, since the book is written in the style of a monograph rather than that of an elementary textbook, and the absence of the cruder forms of sign-posting may be a handicap. To the student who is prepared to make his own abstract it offers a mine of information which will amply repay his industry.

In addition to a comprehensive review of intracranial disease there is an excellent account of peripheral nerve injuries and of the surgery of the sympathetic system, including an assessment of the modern treatment of arterial hypertension. In all sections adequate reference is made to recent literature, and the author's personal experience is freely drawn upon to enhance the practical value of the work.

Notes on Books

The 75th annual volume of *Whitaker's Almanack*, for 1943, has now appeared in three forms—library edition, leather-bound with coloured maps, at 21s.; complete edition, cloth-bound, at 10s.; and a shorter edition, containing the first 704 pages of the full book, paper-bound, at 6s. One of its principal features is the increase in space given to Government and Public Offices, extending to 101 pages. The diary of the war is condensed into 16 pages, and "Government by Party," which appeared in the 1932 edition, is reprinted in the present issue, with an extension covering the past 10 years. Upwards of 30,000 index references are given, ranging from a single line to the classified summary of 250 entries for Scotland and 300 for the United States. The publishers ask us to state that copies of this almanack may not be available at once.

The second edition of Dr. ARTHUR J. AMOR'S *X-ray Atlas of Silicosis* has only one change in its contents—a reference to the work of D'Arcy Hart and E. A. Aslett in their survey of chronic pulmonary disease in South Wales miners. The production of a second edition two years after the first is in part due to destruction of some of the first edition by enemy action. New blocks have had to be made of many of the original illustrations, and in spite of current difficulties their quality has been maintained and, in a number, improved. The reappearance of this valuable monograph is to be welcomed. It is published by John Wright and Sons of Bristol at 30s.

The *Annual Charities Register and Digest* for 1943 has just been published by Longmans, Green and Co. for the Charity Organization Society. This is the fiftieth edition of a very useful reference book which provides information concerning the societies, associations, and other bodies that provide relief in all kinds of affliction and distress. It contains the same number of pages as last year, and gives details of more than 2,700 institutions and societies. Copies can be had from the C.O.S., Denison House, 296, Vauxhall Bridge Road, S.W., or from the publishers (8s. 6d.).

In reviewing the first edition of *The Design of Experiments*, by R. A. FISHER, Sc.D., F.R.S., we expressed the opinion that it was one of the most important contributions to methodology of our time. We see no reason to vary this opinion and are glad to see that, even in these times, a new edition is required, the third in six years. A book like this cannot be easy reading, and its success is good evidence that intelligent persons are increasingly interested in the statistical control of experiments, so that the maximum of information may be had with the least expenditure of time and money. The publishers are Oliver and Boyd, and the price is 12s 6d.

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THE B.M.A. AND THE BEVERIDGE REPORT

In spite of their many professional preoccupations at a time of year when sickness in the civil population makes unusual demands on a doctor's time even in peace, the various committees of the Association have been hard at work studying the Beveridge report, and in particular Assumption B: "Comprehensive health and rehabilitation services for prevention and cure of disease and restoration of capacity for work, available to all members of the community." At its meeting on Feb. 3 the Council of the B.M.A., the proceedings of which are reported in this week's *Supplement*, had before it the recommendations of the committees, the chairmen of which in turn gave the Council some idea of the atmosphere in which discussions had been conducted. The Chairman finally put before the Council a motion for its consideration and ultimate transmission in the form of a recommendation to the Representative Body. The motion was so framed as to embody the sense of the recommendations of the several committees. It was closely examined, and alternative readings of most of the sentences were considered, before the final form was adopted.

> "That it be recommended to the Representative Body that if Parliament, after consideration of the Beveridge report, decides to accept the assumptions of the report and to put into operation the proposals of the report, taken as a whole, including a scheme for comprehensive health and rehabilitation services for prevention and cure of disease and restoration of capacity for work, available to all members of the community, the Association would be willing to co-operate in the preparation of such a scheme provided—
>
> (*a*) That the character, terms, and conditions of the medical service are determined by negotiation and agreement with the medical profession; and
>
> (*b*) That those members of the community who decide not to avail themselves in part or in whole of the benefits of the service open to them should not be precluded from obtaining the medical services they desire from doctors within the scheme, paying for such service privately, with the necessary safeguards to prevent abuse."

This recommendation will be considered by a special meeting of the Representative Body and of the Panel Conference, and by a joint meeting of the two, at the end of March. Between then and now the Divisions will consider the Council's recommendation, and it is hoped that as many members as possible will attend their Division meetings.

The first point to be noticed in the recommendation is that co-operation is offered on the ground that Government action is taken on the report as a whole. This is fundamental. In the first place the Government might offer a sop to the public by putting into effect only the proposals for a medical service. But this service cannot be considered apart from the context of the report, as the medical profession is closely concerned with the health aspects of Sir William Beveridge's attack on want and idleness, the removal of which by his plan would be a public health measure of the first importance. So, although the medical profession must concentrate on Assumption B, it cannot shut out from consideration the report as a whole. In deciding what its attitude to this should be and to the medical implications in it, doctors should keep clearly in mind one factor, and that is the wide public interest in the problem of social security and the growing public desire to see that after this war such security is obtained. No Government, we believe, could afford to let such conditions arise as fostered the bitterness, disillusion, cynicism, and apathy that were the sour fruits of the victory of 1918.

The medical implications of Sir William's Assumption B are contained in the following two sentences from the report: "From the standpoint of social security, a health service providing full preventive and curative treatment of every kind to every citizen without exception, without remuneration limit, and without an economic barrier at any point to delay recourse to it, is the ideal conception. It is proposed accordingly that, in the contributions suggested as part of the plan for social security, there shall be included a payment in virtue of which every citizen will be able to obtain whatever treatment his case requires, at home or in an institution, medical, dental, or subsidiary, without a treatment charge."

That the whole resources of modern medicine should be at the disposal of every man, woman, and child in the country is a proposition to which every doctor naturally assents. That at some times, and in some places, various lets and hindrances prevent some citizens from taking full advantage of these resources cannot be denied. But neither can it be denied that all the time continuous efforts are being made by official and private agencies to fill the gaps that exist, to co-ordinate and unify services, and to facilitate the practical application of new knowledge and technique. There has been general acceptance of the B.M.A.'s proposals that the scope of national health insurance should include consultant and other services, and be extended to the dependants of insured persons. In other words, the idea of a complete service on a compulsory insurance basis is already accepted by the medical profession for roughly nine-tenths of the population. The Beveridge proposal is that such a service should be available to the whole population, rich and poor alike. The medical profession in Great Britain has to make up its mind what its attitude to this proposal is to be.

Upon what grounds could the medical profession oppose the complete acceptance of the Beveridge proposal? It is certain that if it is put into operation it will affect the private practice of all doctors and will affect adversely the incomes of some doctors. But could the medical profession hope to oppose the Beveridge plan successfully on the ground of finance? A more formidable argument against the plan is that the creation of a service open to the whole community might lead sooner or later to a whole-time salaried State service, and to this the majority of the doctors in this country are at present resolutely opposed.

But the "100% proposal" does not necessarily imply a whole-time State salaried service. If it did, the Council of the B.M.A. would have advised the Representative Body to reject it. It would, however, be quite another matter to advise the rejection of the proposal that the State should make available for every member of the community a comprehensive health and rehabilitation service.

Whether the compulsory insurance scheme should cover 100% of the population, or only, say, 85 to 90%, is a matter which Parliament has not yet decided or even discussed. Whatever the people of this country, through their representatives in Parliament, may decide on this issue of coverage, it would be undemocratic, not to say foolish, for the medical profession to run counter to the rest of the community at a time when it needs all its sympathy and support in what is the gist of the matter—namely, determination of the conditions and terms of service. The Council advises co-operation, with the important proviso that the character, terms, and conditions of the service must be negotiated with and agreed by the doctors of this country. And the doctors of this country do not believe that it is in the public interest that the medical profession should be turned into a whole-time salaried civil service, with the doctor the servant of the State. The doctor must be the servant of his patient.

In the past the medical profession has too often found itself fighting a rearguard action. Here, it seems, is an occasion when the medical profession can take a forward-looking view on a matter of the first importance, and this without sacrificing any of those professional principles upon which the practice of medicine is based.

AETIOLOGY OF LUNG CANCER

There has been an alarming increase in the amount of lung cancer diagnosed during the past twenty years. To describe the increase as one in diagnosed cases is important, because improved diagnosis accounts for much of the apparent difference in incidence between present and past; the clinical picture of this disease is not unmistakable, and in the absence of radiological or post-mortem facilities many cases must have gone unrecorded. Nor is it safe to deduce an absolute increase from the experience of any single institution. As Passey has pointed out, largely increased numbers of cases have been recorded from hospitals to which a tuberculosis dispensary is attached, for the evident reason that doubtful cases reach them from a wide area through this channel, while at other hospitals it may be a policy not to admit incurable cases, and there in-patient and post-mortem figures for the disease will be correspondingly low. When these sources of error have been eliminated, and allowance is made for the longer life of the average individual, there nevertheless remains an increase in the frequency of lung cancer which is considered by most authorities to be absolute. It is natural to seek the cause of this in some condition of modern life, and particularly among materials which may be inhaled, since nothing in connexion with cancer is better attested than the local carcinogenic effect of long-continued application of certain "irritants." Tar, certain lubricating oils, soot, arsenic, and various radio-active substances will cause epithelioma of the skin; the long-continued inhalation of any such substance may well produce cancer of the lung. That in the Schneeberg and St. Joachimstal miners' cancer we have a clear example of this effect there is no doubt, but the frequency of the disease among these miners is exceptional, as is the composition of the dust to which they are exposed. It is of greater interest to inquire whether other materials in air to which much larger numbers of people are exposed can have a similar if less pronounced effect. This question can be approached in two ways, of which one is to ascertain the incidence of the disease in occupational classes. Evidence has in fact been extracted from the Registrar-General's returns that lung cancer is commoner in certain occupations. The other method is experimental. It is of course well known that actively carcinogenic substances will produce lung cancer as well as tumours elsewhere, but to obtain evidence bearing more directly on the human disease it is necessary to expose animals to atmospheres containing dust or other supposedly carcinogenic materials on which suspicion has fallen. This is a singularly tedious form of experiment, requiring the utmost patience if the necessary conditions are to be fulfilled.

Such a study has been pursued for ten years by J. Argyll Campbell, whose principal findings are recapitulated and discussed at p. 179. He has been able to show that a variety of dusts, natural or prepared, will increase the frequency of lung tumours in mice, sometimes to a very marked degree. He also advances reasons for regarding these findings as applicable to man. It may perhaps assist judgment on this matter to state the particulars in which the mouse and human tumours differ. The first and most obvious is that lung tumours are exceptionally common in some strains of mice; their incidence in control animals in some of these experiments was 20%. No other animal behaves in this way, and innumerable dusting experiments conducted for the study of silicosis have not been found to produce lung growths in rabbits, guinea-pigs, or rats. The tumour itself in the mouse is usually an adenoma, in which malignant change is the exception. It is true that bronchial adenoma is gaining increased recognition as a common human tumour, but in both site and age incidence it differs from the mouse tumour, while of course it may be held to stand apart from primary lung cancer, the disease with which we are mainly concerned. On the other hand, when lung tumours are produced in mice by actively carcinogenic hydrocarbons they usually take this form, and the mouse adenoma, when it occurs with unexpected frequency, may therefore rightly be regarded as a response to a carcinogenic stimulus. Another aspect of this subject on which finality of conclusion would perhaps be premature is the position of silica. Whether silicosis itself or the inhalation of siliceous dust predisposes to cancer of the lung has been hotly debated. The weight of evidence seems to point to a negative answer, in particular the very imposing figures collected by A. J. Vorwald and J. W. Karr.[1] Campbell's findings, on the other hand, incriminate this agent, both in experiments with pure silicon dioxide and by implication in experiments with road dust, the extraction of which with benzene in order to free it from tar reduced its capacity to stimulate neoplasia, but did not abolish it. It should be mentioned that the validity of this conclusion has been questioned by A. Kling *et al.*[2] on the ground that extraction with benzene does not entirely remove the carcinogenic constituents of tar from dust; minerals are said to absorb tar and part with it reluctantly. They themselves made an artificial mixture of 100 parts of powdered stone, as used for road metal, with 1 part of tar, and after extracting with benzene until this solvent removed nothing more, they treated the powder successively with sulphuric ether, and acid and alkaline alcohol; in all three of these solvents they could demonstrate benzpyrene. This is therefore one of several aspects of a difficult subject upon which some doubt remains. A general belief that some forms of atmospheric pollution may be a factor in producing lung cancer is well justified, and some constituents, notably tar, are more suspect than others. How seriously to regard non-tarry dusts, soot, exhaust gases, and tobacco smoke is a question to which the present answers can only be provisional.

[1] *Amer. J. Path.*, 1938, **14**, 49.
[2] *Bull. Acad. Méd. Paris* 1939 **121**, 784.

WASTING DISEASE AND LESIONS OF THE NERVOUS SYSTEM

The probability of an increased incidence of wasting disease and dietary deficiency in Europe makes a recent contribution from China of particular interest. Hypovitaminosis in man may result from inadequate intake, faulty absorption, excessive loss, or a requirement increased by heightened metabolism in febrile disease, all factors which are known to be prevalent in China. Hsü[1] carried out a very thorough histological examination of the central nervous system in 13 subjects who had died from wasting disease associated with dysentery and tuberculosis. In every case distinct lesions of the intestine were demonstrated. The changes in the nervous system were remarkably uniform in nature, including primary irritation of the Betz cells, and degeneration of the dorsal spinal ganglia, posterior columns, posterior nerve roots, and peripheral nerves. In beriberi peripheral nerves are primarily affected, while in pellagra the brain appears to be the earliest site of disturbance. The symptoms of vitamin-B deficiency were recorded in only one case, but it is possible that these manifestations had been overlooked in the others. The author, indeed, after an exhaustive search of the literature and analysis of his own findings, has come to the conclusion that the combination of pathological changes points to deficiency of the vitamin-B complex. Whether or not this is the case, it raises the interesting problem of the organic basis for the neurological abnormalities that arise in the course of general diseases. The association between disorders of the alimentary tract and disease of the nervous system has long been suspected. Hsü stresses the importance of an exhaustive neuropsychiatric examination in all those showing disturbances of the gastro-intestinal system. It must be left to experimental work to decide whether disease of the alimentary tract acts directly on the central nervous system, presumably by cutting down some hormonal effect or indirectly by impairing the absorption or utilization of one of the vitamins. Meanwhile, it might be wise again to emphasize the importance of adequate vitamin intake for all patients with digestive disorder.

[1] *Arch. Neurol. Psychiat.*, Chicago, 1942, **48**, 271.

THE EPIDEMIOLOGY OF STREPTOCOCCAL INFECTIONS

Of three great advances made during the past twenty years in the study of streptococcal infections two have been American and one a British achievement. The Dicks of Chicago elucidated the relationship of *Str. pyogenes* to scarlet fever, and thus provided the means for its specific treatment and prevention. Lancefield applied the precipitin test to the classification of this organism, and thus furnished a ready means of identifying strains as potentially dangerous. More detailed antigenic analysis, a task beset with difficulties which defeated other workers, was carried to fruition by the late Frederick Griffith, and resulted in the definition of about 30 types, nearly all included in Lancefield's Group A, which are now inseparable from his name. Thanks to the labours of Griffith himself and others whom he instructed in his methods, this country has led the world in studying the epidemiology of haemolytic streptococcal infections. Only by typing has it been possible to prove the source of cases of puerperal fever, to trace the origin of milk-borne scarlet fever, and to follow the migrations of streptococci in epidemics with such various manifestations that they had previously gone unrecognized. That the same streptococcus may successively cause in different individuals tonsillitis, scarlet fever, erysipelas, simple wound infections, an almost symptomless throat catarrh, otitis media, and, if opportunity occurs, puerperal fever, is now generally recognized. Any of these manifestations may be produced in certain circumstances by any streptococcus of Group A, with the single proviso that the rash which alone differentiates scarlet fever from other streptococcal throat infections will develop only if the streptococcus is of one of the types which form the erythrogenic toxin, and then only if the patient is susceptible to that toxin. This knowledge has made plain much that was obscure before, but in the recognition of ward and other epidemics and in devising precautions to check them there is still much to be done in applying it.

The typing of streptococci was for some years a British prerogative, but it has now found its place in the United States, and C. S. Keefer and his colleagues[1] describe a study made in Boston in which 819 strains from various sources were examined. Agglutinating sera were available for 19 of Griffith's types, and served to identify all but 180 strains. The types most commonly encountered were 1, 11, 13, and 15, but, although their frequency distribution doubtless varies in different countries, no conclusions on this should be drawn from any single study: the chance occurrence of epidemics embraced in it will exaggerate the numbers of that type to a figure not representative of a wider area or a longer period. Analysis of the infections caused by each type shows no special organ predilection, or any association between type and a particular lesion such as erysipelas. It was found that when multiple infections occurred in households or institutions, however various their nature, they were usually due to a single type and often traceable to a single individual. The inclusion of many cases of scarlet fever enabled the authors to study the effects of reinfection with a different type of streptococcus during the course of this disease, an occurrence now known to be common in fever hospitals. When a complication such as otitis media occurred early in the disease, the type was usually unchanged; when it developed after the fifteenth day it was unchanged in only 2 cases and different in 16. Two cases of recurrent scarlet fever were both associated with a change of type. Here and in many other of the varied aspects of streptococcal activity the serological method supplies an explanation obtainable in no other way.

[1] *Arch. Intern. Med.*, 1942, **69**, 952.

ANTI-SOCIAL BEHAVIOUR DISORDERS

Most medical men are familiar with the admirable work of the Chadwick Trust in furthering preventive medicine, and the trustees did wisely when they recently instituted a lecture on the differentiation, prevention, and treatment of anti-social behaviour disorders. Such ills are not often regarded as within the scope of State medicine, but they menace the health of the community quite as gravely as do venereal disease or typhoid fever. As Dr. W. Norwood East, the lecturer, said in his opening remarks, Sir Edwin Chadwick, who acted as Jeremy Bentham's secretary for the last three years of Bentham's life, must often have discussed with the philosopher-jurist the causes and treatment of anti-social behaviour, for they were both interested in the subject. In general terms, said Dr. East, such disorders result from stress acting upon an innate constitutional pattern which is modified by environmental factors. Social reactions are closely related to the desire for security and satisfaction, the achievement of pleasure, and the avoidance of pain. In the ordinary affairs of life behaviour is related to both proximate and

distant aims. In strong and harmoniously organized characters whose reactions are well balanced, short-term satisfactions are useful as occasional stimuli which assist them to realize long-term ideals. It is characteristic, on the other hand, of much anti-social disorder that the desire of the moment is more importunate and decisive than a long-term ambition. Disordered behaviour associated with insanity is rarely criminal: less than 1% of persons admitted to prison are insane. The anti-social behaviour of many of these could have been avoided by early medical advice and treatment. Similarly, much anti-social behaviour due to mental deficiency can be prevented if the mental condition is ascertained early and there is effective supervision. Anti-social behaviour associated with neurosis is characterized by its emotional content, which partly depends upon mental conflicts. The most important corrective factor is, perhaps, early recognition. Since the social difficulties of the psychopath are largely due to apparently innate factors, anti-social behaviour disorders in this group are often not easy to prevent. Treatment may be unavoidably restricted to modifying the particular activity which is adversely affecting the behaviour. Child guidance clinics, by recognizing those influences in the child which give rise to unusual behaviour, can often prevent future behaviour disorders. Critics of the methods of Government Departments might do well to study more closely the industry and bold readiness to experiment which the Home Office authorities constantly show in their struggle against delinquency and crime. Dr. Norwood East hopes that the Criminal Justice Bill of 1938 will be revived as soon as the war is over, and declares that the stepping-stones laid down by scientific research workers must be used; for, he argues, in a democratic State we cannot afford to ignore the effect upon each one of us of social hazards which are harmful and preventable. He had already observed in dealing with child guidance that the materialism and determinism of past years are being displaced in many directions by a spiritual approach to some of life's problems which is independent of science. Social historians of the future will be able to judge whether reforms such as the Beveridge plan, which will presumably remove a good deal of the insecurity which is an ingredient in behaviour disorders, have contributed at all towards reducing anti-social behaviour. It may be doubted whether greater material prosperity will produce a better society unless that society is welded by aims and beliefs that are not material.

EXPERIMENTAL TUBERCULOSIS

The role of genetic constitution in determining resistance to tuberculosis is even now not well understood. There are so many variables. Massive infection can overwhelm naturally good resistance, and other factors of a non-genetic character can reinforce or nullify the advantages or disadvantages with which the child may have been born. It is not surprising, therefore, that so much remains mysterious or controversial; but what is surprising, perhaps, is that more use has not been made of animal experiments. This omission lends special interest to the contribution of M. B. Lurie of the Henry Phipps Institute of the University of Pennsylvania (assisted in some observations by P. Zappasodi), who has presented[1] a detailed account of seven years' careful work on rabbits. Six families were used, close inbreeding being practised, and it was found that under uniform environmental conditions there were notable differences in resistance between the families. These differences could be demonstrated by measuring survival time after a parenteral standard dose of tubercle bacilli; after inhalation of known numbers of bacilli in a specially designed apparatus; or after natural respiratory contagion. It was noteworthy that, using the first two methods, the differences could be abolished by sufficiently massive dosage. Under natural conditions of infection—which, it is suggested, are similar to those occurring in man—the rabbit families fell into three groups, and the pulmonary tuberculosis acquired, generation after generation, had the essential features of the disease as manifested by different racial groups of human beings.

After natural respiratory contagion rabbits of the resistant family acquired a tuberculosis of long duration, usually originating in a single, slowly progressive, encapsulating primary focus which became excavated. The draining tracheo-bronchial glands did not become involved. The disease was confined chiefly to the portal of entry, the lungs, where it spread from the softened primary lesion and where the secondary foci progressed in a similarly chronic manner. There was little dissemination to the rest of the body, and in the few instances of pulmonary haematogenous dissemination the tubercles did not thrive. The disease was essentially a localized ulcerative pulmonary phthisis analogous to the reinfection type seen in white adults. Microscopically, it was found that only in caseous foci undergoing softening did the bacilli accumulate in any considerable numbers. The disease extended only by the aspiration of bacillus-laden softened material into preformed channels, the high natural resistance of the tissues being thus overcome by flooding with vast numbers of organisms. What is probably of fundamental importance is that the mononuclear phagocytes of this family acquired the capacity to inhibit the growth of tubercle bacilli in their cytoplasm.

Rabbits of the susceptible families presented a very different picture. The disease also originated as a single primary focus in the lung but rapidly progressed without encapsulation or excavation. The draining glands became massively enlarged and caseous, and widespread blood dissemination then took place. The disease was a primary, rapidly progressive, generalized tuberculosis simulating the so-called childhood type in man and resembling the rapidly fatal form observed in Senegalese troops. Microscopically, tubercle bacilli were seen to swarm in the mononuclears, and blood vessels underwent necrosis *en masse*. Secondary lesions were equally rapidly progressive. In one family, what were apparently factors favourable to resistance were overcome by a particular vulnerability of the blood vessels to bacillary invasion. The rabbits belonging to some families were intermediate in their behaviour, and it is suggested that in them the course of the disease resembled types observed in the American negro. Essentially, resistance seemed to depend on the completeness and rapidity with which the tissues acquired a local immunity. There was also some evidence of an association between high resistance and low skin permeability, the rapid and intense development of allergic sensitivity, and the rapid production of antibodies.

It is good to know that these valuable studies are being continued. One point, for example, which may be elucidated is the number of bacilli forming the unit of infection which is responsible for the single primary focus in the rabbit, and also perhaps in man, for when the inhalation apparatus was used, even with relatively small numbers of bacilli, there were always multiple foci proportional to the dosage.

[1] *Amer. Rev. Tuberc.*, 1941, **44**, Supplement to September issue.

The next session of the General Medical Council will open on Wednesday, Feb. 17, at 10.30 a.m., when the President, Mr. H. L. Eason, will take the chair.

Reports of Societies

PRINCIPLES OF ANATOMY AND THE PERIPHERAL NERVES

At a meeting of the Section of Physical Medicine of the Royal Society of Medicine on Jan. 13, with Dr. PHILIPPE BAUWENS in the chair, Prof. H. A. HARRIS of Cambridge University, who was to have given an address under the title "The Anatomical Basis of Physical Medicine," said that since choosing his subject he had received the Medical Research Council War Memorandum No. 7, *Aids to the Investigation of Peripheral Nerve Injuries*, and it occurred to him that it might be of some advantage to consider to what extent the principles of anatomy were exhibited in this most recent publication.

The development of the limb bud in the human embryo began, he said, towards the end of the first month of embryonic life as a raised papule in the neck region and emerged as a mitten-shaped projection for the hand; a few days later the wrist was in sight, to be followed in turn by the forearm, elbow, arm, and shoulder. The two surfaces of the limb were distinct, the flexor muscles with their fine movements covered with hypersensitive and pliable flexor skin, the extensor muscles with their coarse movements covered by skin relatively less sensitive and tougher. As far back as 1885 there was intensive study of the morphology of the nerve plexuses of the limb by such men as Herringham, Paterson, Head, and Sherrington. It was Herringham in particular who stated that the nerve supply of the limbs was fundamentally segmental. He maintained that the skin of the limb was stretched like a sheet of rubber over the limb, that the extensor area was greater than the flexor area, and that the central nerve of the plexus only emerged on the skin surface at the periphery. He held that although the lower four cervical nerves and the first thoracic nerve constituted the basic five nerves of the brachial plexus, yet some skin had been borrowed from adjoining segments or dermatomes.

In the lower limbs the plexus was fundamentally formed from the last two lumbar nerves and the first three sacral, but as a result of the great development of the buttock and thigh, skin had been borrowed extensively from the adjoining segments or dermatomes at the pre-axial border. This borrowing was limited to the pre-axial border and could not take place at the post-axial border, as this lay "next door" to the territory of the fourth sacral nerve in the perineum in general and in the anus in particular. In the skin of the lower limb, not only were areas supplied by the adjoining dermatomes of the first three lumbar segments, but an area extending from the iliac crest to the great trochanter of the femur was supplied by the lateral branch of the twelfth thoracic or subcostal nerve.

Segmental Nerve Supply of Skin

Herringham paid great attention to the analysis of the typical segmental nerve, its posterior primary division for the skin and muscles of the back, its anterior primary division for the skin and muscles of the body wall, and particularly the lateral branch of the anterior primary division which supplied the flank. The limb bud always developed in the territory of the lateral branch of the anterior primary division of the segmental nerve. If the body were placed with the limbs in the embryonic position of flexion with the thumb and great toe towards the head, palm towards palm and sole towards sole, the pre-axial and post-axial borders of the limb gave the key to all the main points in the cutaneous supply to the limbs. In the upper limb the pre-axial and post-axial borders were marked out roughly by the cephalic and basilic veins; in the lower limb by the great saphenous and the small saphenous veins. Herringham stated that of two spots on the skin of the limb that nearest the pre-axial border tended to be supplied by the higher nerve. Of two spots on the pre-axial border the lower tended to be supplied by the lower nerve, but of two points on the post-axial border the lower was supplied by the higher nerve. Herringham went further, and pointed out that on the ventral and dorsal surfaces of the limb there was a hiatus in the numerical sequence of the nerves, explicable on the ground that the central nerves of the plexus, which failed to reach the surface in these situations, were replaced by cutaneous branches from neighbouring nerves. This gap or hiatus was the axial line.

These classical descriptions by Herringham were in part envisaged even as early as 1857 by Sir John Goodsir, professor of anatomy in Edinburgh a hundred years ago, for he recognized that the higher or pre-axial nerves in the plexus did not run as far into the limb as the lower or post-axial nerves.

Nerve Supply of Muscles

The principles which worked so well for the nerve supply of the skin had their counterpart in the segmental nerve supply of the muscles. Muscles near the pre-axial border, such as the deltoid, would be supplied by the higher nerves, the fifth and sixth cervical, whereas muscles near the post-axial border, such as the flexor carpi ulnaris, would be supplied by the lower nerves, the eighth cervical and first dorsal. In the upper limb all the muscles were supplied by the five basic nerves of the plexus, and there was no borrowing of muscle and nerve from the adjoining segments. On the other hand, in the lower limb, on account of the extensive growth and development of the buttock and thigh, the nerve supply of the muscles was not limited to the five basic nerves, from the fourth lumbar to the third sacral. The nerves and muscles of the adjoining pre-axial second and third lumbar segments had been brought in to provide the muscle and nerve which, with the fourth lumbar segment, constituted the quadriceps mass and the main part of the adductor mass, supplied respectively by the femoral and obturator nerves.

Herringham emphasized the segmental character of the nerve supply to muscle and insisted on the greater complexity of the flexor muscles as compared with the extensors. This complexity was reflected in the fact that the nerves of the flexor compartment were more numerous than those of the extensor compartment. The additional nerve of the flexor compartment was always post-axially placed. In the upper limb the posterior cord supplying the extensor mass was supplied by the lower four cervical nerves only, but the flexors were supplied in addition by the first thoracic nerve, which was post-axially placed, and practically all its fibres were in the ulnar nerve. Similarly, in the lower limb, the extensor mass was supplied by the nerves ranging from the second lumbar to the second sacral, but the flexor mass was supplied also by the third sacral, post-axially placed, in the nerve to the biceps femoris.

Prof. Harris maintained that the recent M.R.C. report showed but little evidence of acquaintance with the clinical implications of the work of Herringham on the morphology of the nerves to the skin and muscles of the limbs. It showed also little evidence of our knowledge of the classification and actions of muscles as established by Winslow, John Hilton, Duchenne, Charles Beevor, and Sherrington. The editions of Quain's *Anatomy* and of Cunningham's *Text Book of Anatomy* published at the beginning of the century had not neglected the importance of these anatomical principles. Modern textbooks had shown a tendency to do so.

The Stretched Nerve

A correspondence had recently taken place in the *British Medical Journal* concerning new and unnecessary names for certain objective and subjective phenomena in relation to nerve injuries. With regard to nerve injury the thing which mattered most was the stretching of the nerve or interference with its blood supply. Everyone was familiar with "pins and needles" of the leg and foot, a vascular phenomenon, but the stretching of a nerve was a more serious matter because recovery might not follow. For this reason it was worth while considering the many nerves in the body which were in such a position that they were liable to be injured as a result of stretching in various occupational injuries.

One common symptom was found in people working a lever when, instead of depressing it with the hand as a whole, they used only the hypothenar eminence to bang the lever down. They injured the ulnar nerve between the pisiform and the hook of the unciform bone. Similar trouble arose from working with the elbows pressed on a work bench with an upturned edge like a tea-tray. The ulnar nerve was rubbed on the coronoid process of the ulna and palsy resulted. Prof. Harris

demonstrated by means of a skeleton the number of bends in the course of the ulnar nerve which went down the length of the arm. The fibres of the first thoracic nerve in the ulnar were stretched over the neck of the first rib; the ulnar nerve was stretched at the medial condyle of the humerus, and again as it passed around the hook of the unciform. Similarly those fibres of the fourth lumbar nerve which joined the sciatic presented sharp bends on emerging outwards from the intervertebral foramen, passing downwards in front of the sacro-iliac joint, backwards through the great sciatic foramen, and again outwards almost to the anterior superior iliac spine in the course of the superior gluteal nerve to glutaeus medius and minimus and tensor fasciae femoris. Another nerve, the sixth cranial, was in such a position that any disturbance of the brain or the cerebrospinal fluid was liable to stretch it, giving the transient palsies seen after slight accidents. The first thoracic, the fourth lumbar, and the sixth cranial nerve "lived dangerously," and were perpetually on the verge of a breakdown.

He also referred to the diagrams customarily given to show the tendon sheaths. A tendon sheath was grown where it was wanted. It made its appearance in response to the range of movement. The same with bursae. These would be grown where they were wanted, either in response to movement or to pressure, or because of ill-fitting footwear or unaccustomed work. The arrangement and extent of the flexor synovial sheaths in the hand were determined by the range of movement of the metacarpal bones and overlying tendons. This was maximal in the mobile metacarpal of the thumb with a continuous synovial sheath, next greatest in the mobile metacarpal of the little finger, and least in the rigid metacarpals of the index and middle fingers. He believed that the principles of anatomy were there for whoever wished to seek them; the monstrous burden of endless detail now placed upon the student was entirely due to the fact that teachers would not recognize that principles were designed to save time, to avoid useless memorizing, and to provoke further thought. In anatomy, as in other subjects, it was well worth while occasionally to pay heed to one's grandfather, because he might have acquired not only facts but certain valuable working hypotheses or principles.

SMALL-POX IN SCOTLAND IN 1942

At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on Jan. 22, with Dr. J. D. ROLLESTON in the chair, some aspects of the epidemiology of small-pox outbreaks in Scotland in 1942 were discussed.

Dr. IAN SUTHERLAND, having first mentioned two earlier epidemics in Scotland—one in Glasgow, a major small-pox epidemic in 1920-1 which caused 176 deaths, and the other in Dundee, a minor epidemic in 1927-8 which caused no deaths—said that there arrived at Glasgow on May 29 last year a ship with a case of major small-pox on board. The source of infection was a mystery. The man might have been infected while ashore at Capetown, or on board from a missed case, but no small-pox was known to exist at Capetown at the time the boat was there, and there was no other case on board with a rash. An electrical engineer occupied the same cabin as this first case and looked after the man, but he did not get small-pox; he went, however, to repair a potato-peeling machine for the assistant cook, and the assistant cook subsequently developed a small-pox eruption. In this outbreak in Glasgow there were 11 ship cases, 21 in the general population in which the source of infection was untraceable, and 4 in contacts. The "untraceable" cases were not scattered throughout the city area; the west and a large part of the south were free. Following the main wave of "untraceable" cases there were three or four secondary cases, including some persons who had little contact with the outside world and whose chances of acquiring a prevalent infection might be thought to be small. The range of ages in the "untraceable" cases was from 12 to 72. The last group included a patient in a mental hospital outside Glasgow who had been there for 14 years and had not had a visitor during the previous three weeks.

The epidemic in Fife apparently started with a patient whose rash appeared on August 21, and 26 subsequent cases were traceable to the original case or to secondary or derived cases. A general vaccination campaign was started in the district in October, a very large number of people accepting vaccination. Two further cases occurred in November, one of them "untraceable." No connexion was established between the Glasgow and the Fife outbreaks. Eight days after the last Fife contact case a man who was under the care of a surgeon in an Edinburgh hospital developed a small-pox rash, and this was followed by a small-pox rash in a boy and 3 students who had no connexion with the hospital patient, and in 16 patients of the same hospital and convalescent home, many of whom had been returned to their own homes before the outbreak declared itself. In the convalescent home the outbreak was baffling. The cases were confined to patients in one ward, about half of whom developed small-pox. The only connexions between the hospital and the convalescent home were the laundry and the interhospital ambulance, but investigation of these was negative. The next stage in the Edinburgh outbreak was the appearance of a group of 8 "untraceable" cases spread over 30 days in the general population. There was no feature of special interest in the social incidence, and no proof that the Edinburgh cases derived from the previous outbreaks. The disease was of a major type, with a fatality rate of 24%. Known contacts were always offered, and rarely refused, vaccination. General vaccination campaigns were started in Glasgow on June 30, in Fife on Oct. 3, and in Edinburgh on Nov. 18. Reviewing the range of clinical manifestations, the possibility of infection below the level of clinical recognizability could not be excluded without postulating any change in virulence; the existence of carriers remained speculative.

Dr. J. GLEN based his remarks on 35 cases which were admitted to Robroyston Hospital, Glasgow. There was evidence that a virulent infection was concerned; 64% of the cases were severe, including haemorrhagic and confluent cases. The routine treatment was as follows: 2 g. of sulphadiazine given 4-hourly day and night for 24 or 36 hours, followed by 1 g. 4-hourly for 6 to 10 days, typical cases receiving a total of 50 to 60 g. In addition 100 g. of ascorbic acid was given. In severe cases the eyes were irrigated with normal saline 2-hourly during the day and 4-hourly during the night. There were three groups of cases: (1) discrete small-pox in 18 cases, of which 6 were severe, none of which had been vaccinated; none of the discrete cases proved fatal; (2) haemorrhagic small-pox in 4 cases, 3 of them unvaccinated, and all were fatal; (3) confluent small-pox in 11 cases; 8 of these were unvaccinated, and in the 3 who had been vaccinated the vaccination had taken place 72, 37, and 13 years previously; 3 deaths occurred. No toxic complications were observed with the drug used.

Post-vaccinal Picture

Dr. PETER MCKENZIE said that in July, 1942, in Glasgow approximately half a million persons were vaccinated. Arrangements were made to concentrate any cases of encephalitis and vaccinal eruptions in one hospital. Fourteen cases were admitted as vaccinal encephalitis, and in 7 the diagnosis was confirmed. In no case did encephalitis follow primary vaccination in infancy; 6 of the 7 cases occurred in previously unvaccinated children between the ages of 2 and 16. The time of onset varied from 6 to 14 days after vaccination, and the duration of illness was from 5 days to 6 weeks; 2 of the children died, the other 5 recovered completely. In both the fatal cases there were rolling nystagmoid movements of the eyes with marked strabismus which varied from hour to hour. The arms were spastic and flexed, and on attempting to elicit nuchal rigidity a rough tremor developed in the forearms. Sections of the brain in the fatal cases showed a distinct zone of perivascular infiltration and oedema, with a suggestion of some lysis of the cerebral tissue in the part. More specialized neurological methods revealed that in the perivascular zones there had been obvious loss of myelin. During the epidemic period 3 cases were admitted to hospital which appeared clinically to be Kaposi's varicelliform dermatosis, characterized by the rapid appearance of pustules on the head, arms, and legs of a child already suffering from eczema. It was apparent in these 3 cases that the pustules in no way resembled varicella, but were indeed varioliform in character. All 3 patients were

unvaccinated. He had been able to trace a further 7 cases of this condition which occurred in Glasgow during July and August, 1942. This was a rare condition, and the occurrence of a number of cases in relation to an outbreak of variola must be regarded as of some significance.

In further discussion Dr. GAUTIER (League of Nations Health Section) said that experience on the Continent had suggested that certain strains of lymph were more likely to give rise to post-vaccinal encephalitis. Dr. ANTONY DAVIDSON spoke of the good response of the Scottish public to vaccination, over one million persons having been vaccinated. He also referred to the capricious nature of the spread of small-pox, which made it the more difficult to control, and the increased difficulty in the clinical diagnosis of the disease in view of the fact that the long disappearance of this infection had left younger medical men unfamiliar with it. Col. WILLIAM BUTLER recalled the London epidemic of 1905, when it was found that vaccination given during the incubating period did not protect, so that it was a common experience to have vaccinia and small-pox concurrently, and these cases were more severe than the other features of the attack seemed to warrant. Sir LEONARD ROGERS urged that a declaration on the need not only for vaccination in infancy but for subsequent vaccination was required, and the Section passed a resolution in that sense. Dr. J. A. H. BRINCKER, after recalling an outbreak in Kent where secondary cases came out a couple of months later, asked whether they were sure that the cases of post-vaccinal encephalitis had nothing to do with the vaccine. Was it not possible that these cases might be due to a virus or some other form of infection latent in the individual, which the fact of vaccination was enough to set in action? Dr. E. A. UNDERWOOD said that there was a fair amount of evidence that post-vaccinal encephalitis was the precursor of some neurotrophic change in the nervous system which expressed itself not only in this form but in other similar conditions.

The PRESIDENT said that it was important to emphasize the fact that the encephalitis following vaccination did not occur in infancy, and that vaccination should be carried out as soon after birth as possible. It was important also that the child suffering from eruptions should not be vaccinated.

MATERNAL NUTRITION DURING WARTIME

At a meeting of the Medical Society of London on January 18, with Dr. HOPE GOSSE, the president, in the chair, a discussion took place on the subject of maternal nutrition, though it ranged also over the general subject of nutrition in wartime.

Prof. JAMES YOUNG said that from the evidence available it was not easy to determine the effect of the present planned dietary on the adequacy of maternal nutrition. The drastic restriction in meat, eggs, and fish had reduced the main sources of first-class protein and iron, and there had been a compensatory increase in the consumption of bread, potatoes, and other vegetables. Priority for milk for pregnant and nursing women had to some extent neutralized this dietary shift; priority in eggs appeared to be fictitious, and should not be taken into account in assessment of present nutrition standards. There was some evidence that deficiency anaemia was on the increase among women and infants, but none, so far as he knew, of calcium shortage. The incidence of rickets among infants required serious study. The intakes of vitamins A and D were relatively satisfactory because of the priority in milk and the fortification of margarine. The substitution of 85% extraction flour for white bread had improved the situation with regard to the B complex. There was some evidence of shortage in vitamin C.

He proceeded to give results of an investigation carried out by Dr. Hilda Hargreaves at the British Postgraduate Medical School on the mean birth weights of infants and the evidence of prematurity and immaturity during the years 1937-42 (omitting 1939). Prematurity was defined as birth before the 40th week, and immaturity related to infants under 5½ lb. in weight. The investigation had been restricted to booked cases only, and did not include cases admitted as emergencies. Comparing 1938 (the last full peace year) and 1942, the results were as shown in the accompanying table. Both in primigravidae and multigravidae there had been an appreciable fall in the mean birth weight of the infants. In

Year	Total Births	Mean Birth Weight Full-time Infants		Premature Infants		Immature Infants (under 5½ lb.)	
		Number	lb.	Number	Per cent.	Number	Per cent.
Primigravidae							
1938	890	705	7·31	162	18·20	70	7·86
1942	804	679	7·08	98	12·18	73	9·07
Multigravidae							
1938	875	740	7·54	108	12·34	48	5·48
1942	629	531	7·39	81	12·87	41	6·51

the primigravidae there had been a striking fall in the prematurity rate during the years 1941 and 1942 (from 18 or 19% in the earlier years to 11.06% in 1941 and 12.18% in 1942). There had been no appreciable trend in the immaturity rate in either category. There had been a marked drop in the prematurity rate for primigravidae, but no similar decline in the immaturity rate, and the reason for this discrepancy was not easy to explain. It might be that, although in the earlier years the prematurity rate was higher, the drop in the mean birth weights of full-term children had in later years implied the transfer of a relatively larger number of infants during those years to the immaturity group.

In conclusion Prof. Young said that a critical analysis of the evidence permitted some conclusions to be drawn, although many of the data were incomplete or equivocal. There could be no doubt that the dietary standards of the mother during pregnancy and lactation exerted a profound influence on her health and on the health and growth of the infant before and after birth. It had become clear that this was a dominating consideration in the social, economic, and administrative reforms directed to the improvement of the health of the nation.

Broader Nutritional Considerations

Dr. T. IZOD BENNETT, after illustrating some of the results of vitamin deficiency, said that a great deal of nonsense had been and would be talked about vitamins. Instead of thinking in terms of normal human beings having more or less normal and varied food, many had approached this subject of vitamins from the point of view of laboratory animals placed on an unnatural diet and exemplifying gross deficiencies. The first law of nutrition was to ensure the primary elements of diet—protein, carbohydrates, and so on; and the second law was to ensure that these substances were given so far as possible in the form of natural food and not as synthetic preparations or extractives. If the latter expedient were adopted, and one factor, say a vitamin B complex, were added, there would almost certainly be a shortage of another factor which the chemist had not been clever enough to isolate; or, to put the matter more broadly, the primary constituents of diet were far more important than vitamins. If the natural foods were cut too low there would quickly be a shortage of some of the amino acids, which, although they might not be required in great quantity, were essential for the proper building up of protoplasm.

Some conditions which were described as due to vitamin deficiency were really due to psychological conditions or to faulty food habits; but these cases were very few and far between. Deficiencies were also seen in patients with ulcerative colitis, for example, due to excessive elimination. An increase in tuberculosis was sometimes ascribed to vitamin want, but he felt that it ought not to be so ascribed when such obvious causes as lack of ventilation and overcrowding might be cited. Neither in the wards nor in the out-patient department had he seen an increased number of deficiency cases.

Mr. ALECK BOURNE said that he thought it was the general experience that prematurity, which accounted for about 60% of all neonatal deaths, was very much conditioned by nutrition. He was surprised to hear that there was no vitamin deficiency at the present time in this country. This seemed contrary to the experience of Orr and others; there must, he thought, be a certain amount of subclinical deficiency. On the continent of Europe one of the most urgent tasks after the armistice would be the feeding of pregnant women. He believed that the rise and fall of tuberculosis depended to a considerable degree upon nutrition, and that an increased incidence was not to be put down solely to conditions arising from the black-out.

Correspondence

A Member Resigns

SIR,—Your leading article (Jan. 30, p. 135) is interesting; the member has done a service to the B.M.A. Your article shows the Association is perturbed by the letter and recognizes there is some reason for the member's criticisms. "There is no smoke without fire." I have been a member of the B.M.A. for over forty years and have seen many ups and downs, mostly "ups," as the B.M.A. has done great service for its members. We are now going through one of the "downs." Many members are threatening resignation, especially the younger ones; the older members are apathetic. I often hear them say, "What is the Association doing for its members?" Others say, "Only playing into the hand of the Ministry." I try to point out that members are answerable for the policy of its officers. "Why don't you attend meetings?" I ask. "What is the good?" is the answer; "too many old men in power and we are too soft to turn them out." The younger generation should now take its place on the councils of the B.M.A. The profession is hoping for a real lead by the B.M.A. in the future: not a bolstering up of the old methods, but a true progressive policy which will appeal to the younger generation. The Association is the largest and most powerful medical organization, but it appears to many members to show little originality in its policy.—I am, etc.,

Birmingham. F. A. L. BURGES.

SIR,—I write as a member of twenty years' standing who has no intention of resigning his membership, in spite of not always seeing "eye to eye" with B.M.A. policy.

A patient, a member of the teaching profession, surprised me one day by saying, "Your profession has the strongest 'trade union' in the country." Thinking he meant the B.M.A. I disagreed with him, as in my experience negotiations between the Health Ministry and the B.M.A. invariably turn to the advantage of the former. He was thinking, however, of the power of the G.M.C., which is an entirely different matter, as I explained to him. This confusion of thought as regards the B.M.A. and the G.M.C. is not uncommon among the lay public, and something could be done to re-educate them accordingly.

The old saying that "the people get the Government they deserve" applies equally well to the British Medical Association.—I am, etc.,

East Kilbride. JOHN MCLAREN, M.B.

SIR,—Your leading article published under the above heading (Jan. 30, p. 135) is interesting to me, a member of the B.M.A. for forty years. I am grateful for what they have done for me personally, on more than one occasion, as well as for the profession as a whole, both in and out of Parliament. The Association always takes a leading and honourable part in current medical topics. It always tenders sound advice when consulted by its members. Non-members are invariably welcome at its meetings. There is no other body of medical men more representative of the profession, both young and old, than the B.M.A. "Splitting," if there be any, is done by individuals, not by the Association. Medical progress cannot but be retarded by destructive criticism. But the respect of the general public is assured, as it is well aware of the power for good for which the B.M.A. stands and has always stood.—I am, etc.,

London, W.2. R. GALWAY MURRAY.

SIR,—As we have many organs in one body and all organs have not the same function, so we being many—general practitioners, consultants, surgeons, pathologists, and so on—are one body in the British Medical Association, whose organization corresponds to the nervous system which enables the body to act as a co-ordinated whole. That is the ideal. Alas, how far short of it we have fallen in the actual!

Perhaps the most serious result of this poor performance is that owing to failure on the part of members to make proper use of the Divisional Meeting the Central Executive is not brought under the will of the membership. Now to justify its existence an executive must act in obedience to the will either of those who have placed it where it is or of some other interest, whichever applies the greater pressure. Every self-respecting executive would prefer to obey the former, but it cannot choose. It must ultimately yield to superior force, wherever it comes from, or resign. The Executive of the B.M.A. is no exception to this law. We, the members, have failed to give it a proper backing, and now there is lots of evidence to prove that it has been yielding to outside pressure. Neither the members nor their patients have ever demanded a planned medical service, except as moved by propaganda, and yet our Executive is actively engaged in the furtherance of such a scheme. It justifies its action by declaring that its plan is designed to save us and the country from the imposition of a somewhat different plan of which it does not approve. But this is merely to confess that the B.M.A. has lost the initiative and that it is no longer master in its own house. Were space available particulars might be given of the nature of the outside pressure which is being applied, but, since it is not, these details, which are of relative unimportance to the present argument, must be omitted.

From what has been said it now appears obvious that the essential task of the moment is to achieve unity within "the body," and to take the necessary steps to generate a sufficiency of force to eject the invader. That boils down to improving the mechanism by which the member may impress his will on the Executive, and inducing him to use it. Brief references will now be made to three portions of this mechanism.

(1) Annual Representative Meeting. This appears useless for the purpose mentioned. If the report in the *Supplement* of the last A.R.M. was a true picture then the meeting was a fiasco. Something must be done about it. I don't quite know what.

(2) Our Representatives. These must take their job much more seriously than is usually the case. They must find out what their constituents want and continuously press these demands on Headquarters, not wait for the A.R.M. Perhaps some paid representatives would be worth while.

(3) Divisional meeting (political). Everything depends on this. It is the power house. It is the source of policy. It represents the circumference from which a continuous stream of stimuli should pass to the centre, keeping it up to scratch. Here are the end-organs keeping the mind in touch with reality. Members should state clearly what they want in both particular and general terms, and transmit these demands through their representative to Headquarters. The following is an example of a general statement of policy presented to one Divisional meeting for its consideration: We want, before every other professional consideration, freedom to function as doctors in response to the demands of our patients and to the satisfaction of the persons immediately concerned. Any interference with or threat to this freedom shall be resisted with all our power.

I have a good deal of sympathy with the writer of the letter which is the subject of your leader, "A Member Resigns." He sensed truly that there is something seriously wrong. He acted. Unfortunately, in my opinion, he acted ill-advisedly. I hope he will reconsider his decision, and that if at some future date he should desire to rejoin the Association no difficulty will be placed in his way.—I am, etc.,

Bexley, Kent. E. U. MACWILLIAM.

"Calorie Control" Diabetic Diet

SIR,—Dr. A. C. Crooke's article (Jan. 16, p. 64) appeared to suggest the practicability of permitting a free interchange of carbohydrates, proteins, and fats in diabetic diets, providing the total caloric value remained constant. Dr. R. D. Lawrence (Jan. 30, p. 143) queried, I think with justification, both the theory and practice. Dr. Crooke then made it clear that he meant "within the limits of experiments described." Perhaps these limits could be defined more clearly and mathematically, in respect not only to permissibility but also to actuality. As regards theory, Dr. Crooke draws attention to Prof. Ellis's experiments in which he replaced proteins and fat by their glucose equivalent, and found, as a result, a strikingly diminished insulin requirement. I wonder if these important experiments are strictly applicable, since (1) Ellis did not suggest that there

was no need to vary the insulin dosage accordingly—on the contrary very rapid changes were necessary; and (2) he gave the insulin and glucose hourly throughout the day and night.

Nevertheless, it is true that when Porges and Adlersberg first suggested high carbohydrate diets in diabetes there were objections raised on physiological grounds. It may be that further clinical experiments will justify Crooke's suggested innovation, but until then I think it more prudent for those in charge of diabetic patients to adhere to present practice.—I am, etc.,

London, W.1. S. L. SIMPSON.

SIR,—Dr. A. C. Crooke (Jan. 16, p. 64) proposes an interesting revolution in diabetic dietary, and claims that he has shown this revolution to be successful in a number of cases. In fact he has shown no such thing. He claims that protein, fat, and carbohydrate are interchangeable in a diabetic diet so long as the calorie intake is constant. This is a remarkable claim, and it is made without evidence, for he gives no details of the actual carbohydrate, protein, and fat intakes of his patients. Dietary habits are hard to alter, and it is most likely that the majority of his patients retained their previous diets more or less intact. Who would choose to have nothing but bacon and butter for breakfast if cereal and bread are available? Further, wartime restrictions (even with the extra allowances for diabetics) make it impossible to subsist entirely on protein and fat. The diabetic ration allows about 75 g. protein and 100 g. fat. This gives 1,200 calories, so that 200 g. carbohydrate are necessary to make up a diet of 2,000 calories. This is a reasonable orthodox diet and may well have been the diet taken by Dr. Crooke's patients, who were allowed 2,000 calories.

To substantiate Dr. Crooke's claim it would be necessary to study in-patients (who alone can be brought under accurate dietary control), to balance them with insulin on pure carbohydrate diets, and to estimate their blood sugar throughout the day. Then they would have to be put on to pure protein and fat diets of the same calorie value with the same insulin dosage. If his hypothesis is correct then the blood-sugar levels throughout the day should remain unchanged. Until such evidence is forthcoming it would be foolish to accept Dr. Crooke's revolutionary hypothesis. In peacetime, with unlimited protein and fat, it might be dangerous. There is, however, one inference that may be derived from his paper, and that is, that diabetics are very conservative in their dietary habits. It is important to remember this when conclusions are reached as the result of experiments with out-patients.—I am, etc.,

St. Bartholomew's Hospital, E.C.1. C. M. FLETCHER.

Nomenclature of Typhus Group

SIR,—In your issue of Nov. 21 (p. 597) Dr. A. Felix, in discussing the nomenclature of the typhus group of fevers, takes me to task for the alleged recent introduction of the term "exanthematic" typhus as a synonym for louse-borne typhus. The propriety of using the adjective "exanthematic" in speaking of the relationship between louse-borne and flea-borne typhus, in which latter condition the rash is as a rule less in evidence than in louse-borne typhus, may be open to question. It is, however, incorrect to assert that "exanthematic" as applied to typhus is "a new invention." Dr. Felix can hardly have forgotten that on the Continent "typhus exanthematicus," "typhus exanthématique," and "tifus exantemático" have been in use for many a long day. An examination of past volumes of the *Tropical Diseases Bulletin* and of standard English textbooks here available, many of them by no means recent, shows that the term "exanthematic" applied to louse-borne typhus is of such an age that I cannot well claim its parentage even if I had wished to do so.—I am, etc.,

G. M. FINDLAY.

Eventration of the Diaphragm

SIR,—I venture to think that Dr. Mills (Jan. 23, p. 97) is incorrect in regarding his interesting case of eventration as congenital in origin. The clinical and radiological features are rather more in keeping with a diagnosis of *aérogastrie bloquée*, which he dismisses, I think, too lightly. I am not familiar with the occurrence of the cup-and-spill or cascade type of stomach in congenital eventration of the diaphragm, but it has been a feature of all of the four or five cases of *aérogastrie bloquée* that I have seen. The loculation is due to the pressure of gas in the splenic flexure of the colon and has been well called the pressure hour-glass effect. It is my belief that the condition of *aérogastrie bloquée* starts in an upper gastric loculus formed in this way. In this loculus gas is trapped, and as its pressure increases the cardia becomes displaced and relief by belching is prevented. Two of my patients could not belch wind and never had been able to as long as they could remember. The upper loculus gradually distends backwards and upwards, pushing the left dome of the diaphragm into the thorax and the heart over to the right. Pain, and sometimes very severe pain, is a common though not invariable symptom; fullness and distension are usual, and sometimes an upper abdominal tumour may be visible. In my view, then, Dr. Mills's case is one of eventration of the diaphragm secondary to *aérogastrie bloquée*.

I was not aware of Korns's sign, but the divergence of the costal margin on inspiration is an interesting and somewhat neglected physical sign in diagnosis, occurring to a greater or less extent in all cases where contraction of the diaphragm is exerted through an arc greater than normal, thus offering less than its usual antagonism to the intercostal muscles. The movements of the costal margin as an aid to diagnosis are well described by Charles F. Hoover in the Nelson *Loose Leaf Medicine*, Volume III.—I am, etc.,

Birmingham. T. L. HARDY.

Houses to Live In

SIR,—"Homes to Live In" would have been even better for the title of your leading article (Jan. 30, p. 136). You will say that that was not the question asked, but I reply that it ought to have been. We are all out for that "harmony of human relationship" mentioned in the review of *Psychological Effects of War on Citizen and Soldier* (Jan. 30, p. 133), and here is a great opportunity for our profession not to accept calmly the *status quo* or to stand by while grievous wrong may be done to the body politic. Every person is entitled in a democracy to be recognized as a personality, the roots of which are embedded in family life. We may play a large part in insisting upon this. The College should emphasize the fact that tenement flats are destructive of family life. The sound instinct and knowledge of the people recognize this, and over 90% of them have said so. Warehousing our peoples does not make for a vigorous people full of initiative.

You may wonder why I say this, but it is not possible to argue this question without the knowledge that vested interests in the land of great cities and in the materials of which flats are made are looking for encouragement just now, and it should be our business not to appear as "appeasers." Harmony of social life demands a positive policy. We do not want to wake up to find that damage has been inflicted upon people by foisting on them a sterile unimaginative static condition which need not exist.—I am, etc.,

Letchworth, Herts. NORMAN MACFADYEN.

Sulphonamide-resistant Bacteria

SIR,—I was much interested in the article by J. Petro (*Lancet*. 1943, **1**, 35) on the increasing incidence of a strain of gonococcus which is resistant to the action of the sulphonamides. I think a fair inference is that this strain has become resistant due to the ineffectual treatment of patients by too small doses of the sulphonamides. Is it not time that the medical profession at large realized this danger, and took greater care to avoid breeding strains of organisms which may spread, and thus give rise to a state of affairs approximating to the pre-sulphonamide era?

I have in mind particularly the treatment of streptococcal sore throats by means of these drugs. It was, and to some extent still is, the practice of many nurses, medical students, and even medical men to take a sulphonamide whenever they have a sore throat. The doses are nearly always much too small, so as to avoid the unpleasant side-reactions. Even with the very best use of these drugs, it is practically impossible to remove all haemolytic streptococci from an infected throat, and those which remain are resistant to further dosage. If this germ is now coughed on to the perineum of a puerperal woman she is likely to have puerperal sepsis of the resistant type. Only a day or two ago I came across a case of a medical

student, now engaged on her "midder" course, who had a sore throat and was taking large doses of sulphapyridine even before the bacteriological diagnosis was completed. Presumably, she would have been excluded from the midwifery wards until her throat was pronounced clear of haemolytic streptococci after three swabs; but this precaution is by no means universal, and many a doctor must return to his practice still carrying haemolytic streptococci in his throat, now with an increased fastness to these drugs. Before the sulphonamides sore throats were very successfully treated by the medical methods of gargles, etc. I feel strongly that we should return to these methods of treatment, and only use these new drugs when we are sure that we can completely exterminate the germ population which is the cause of the disease we are treating, or when no other treatment will succeed.—I am, etc.,

Amersham. HENDRIK MULLER.

Military Psychiatry

SIR,—The last paragraph of Dr. Richard Eager's letter (Jan. 23, p. 111) suggests that insufficient attention is being given by medical recruiting boards to nervous and mental manifestations before enlistment. It is not so easy as that. A psychoneurotic can appear before a board and be found physically fit and answer all questions intelligently without disclosing previous neurotic attacks. And, in point of fact, he may be truthful, for in the even course of civil life no abnormal mental condition may ever have been evoked. Medical boards are not slow to consult their psychiatrists if there is any indication of mental deficiency. Modern Army "toughening" conditions find various recruits unable to respond to the demands made upon them, and an anxiety neurosis develops which goes from bad to worse in their course of intensive training.

The remedy does not lie in making recriminations to the boards and discharging these cases from the Service, but in further efforts to secure proper adjustment. Many a man found unsuitable for a machine-gun team would be quite all right as a batman or in equipment stores or the cook-house. The number of discharges is far too large. Few regimental medical officers, however, can spare time to supervise a neurotic, especially one who is keen to get out of the Army and finds a claim to nocturnal enuresis or other malingering devices an ever-present help in regaining his freedom from service.—I am, etc.,

Dalkeith, Midlothian. G. DOUGLAS GRAY.

Unwarranted Cardiac Invalidism in Children

SIR,—With reference to Dr. R. P. Garrow's letter (Jan. 23, p. 114) may I report a case which is very illustrative of the risk of undue stress being laid upon systolic murmurs without more detailed examination by radiology and, where possible, the electrocardiograph.

In 1930 I was asked, incidentally to a private visit, to examine a younger sister of a friend. With the stethoscope there were gross murmurs, which I have since loosely described as "the thorax was like a musical box." I found the child had always been healthy, but this condition had been discovered by routine school examination. The mother had been told to take the child to one of the large teaching hospitals, I think, every fortnight. I refused to give an opinion until the child had been brought to me for *x*-ray examination, when I found the heart normal in position, contour, size, and pulsation. I then took upon myself the responsibility of telling the mother not to take her again to the teaching hospital, as this could only be for demonstration purposes, and in my opinion would render the child a pampered chronic invalid. Meanwhile I advised moderation in exercise and that the child should certainly attend school. I re-examined her three months later and I have seen her from time to time. Later the child not only excelled in all sports, particularly high-diving, but had a brilliant scholastic career, gaining the B.Sc. and higher qualifications, with appointment as a demonstrator at a university. A pretty girl, a brilliant academic career appeared likely when, last July, she came and informed me she wished to forgo this future to join the W.R.N.S. without any compulsion to do so, but was afraid she would be rejected, and asked my assistance. I wrote a letter stating her case to the relative medical board. On stethoscopic findings the board was apparently afraid to pass her but sent her to a well-known cardiologist. He concurred in my opinion, she was passed, and now for many months has been engaged, I understand, on mathematical calculation work of a metrological nature.

I feel sure that had earlier importance been placed upon this very marked case of systolic murmurs, with years of attendance at hospital for demonstration, the child would have long ago been a chronic invalid. In numerous cases of heavy life policies, after disclosing the facts of systolic murmurs with radiological normality I have recommended first-class acceptance, and, to date, have never been informed by the respective insurance companies that my recommendation has resulted in early decease and payment of the insurance.—I am, etc.,

London, E.7. BERNARD LEGGETT.

Ethyl Chloride Spray in Pleuritic Pain

SIR,—In view of the relief afforded to patients with sprains of the ankle and similar conditions by spraying the part locally with ethyl chloride, it occurred to me to try the method in cases of pleuritic pain. The effect proved to be pronounced and immediate, and the relief experienced by the sufferers distinctly gratifying.

The method is simplicity itself, consisting in locating the pain so far as possible, which, generally speaking, is not difficult, and spraying a patch over it about 2 inches square with ethyl chloride till blanching occurs. Often a single application is enough, but in cases of very sharp and severe pain which is only mitigated and returns in a short time further applications may be made. I should think it is worth while to call—or maybe to recall—the attention of the profession to this extremely simple and apparently harmless method of relieving what is often a most distressing symptom.

I should be interested to hear of the effect in pneumonia and allied conditions, as my own experience is for the most part limited to pleuritic pain arising in connexion with tuberculous lesions. No doubt there are a number of other conditions amenable to this form of therapy. For instance, one patient recently, who had severe pain over the right frontal region due to sinusitis, experienced immediate relief. In this case it was, of course, necessary to shield the eye itself from the spray.—I am, etc.,

NORMAN MACDONALD.

Diphtheria during Immunization

SIR,—It would be a pity if such a case as is recorded by Dr. G. A. Garrett (Jan. 23, p. 102) were to be numbered under the above heading. The case is clearly one of follicular tonsillitis in one who was a carrier of the Klebs-Loeffler bacillus. There was no clinical diphtheria, which would have required both notification and antitoxin. There is no evidence that a prophylactic activates a dormant bacillus. The suggestion to swab all throats before inoculation and use antitoxin in cases with a positive finding is not a practical policy and would greatly interfere with prophylaxis. I had a nurse who was a carrier of K.L.B. who had to leave hospital and was in an infectious diseases hospital for three months to clear her throat, but it was found impossible to do so. Carriers are not all easily cleared of their variety of K.L.B. The diagnosis of diphtheria rests on clinical phenomena and not on the presence or absence on the swabs of K.L.B.—I am, etc.,

Southsea. A. G. NEWELL.

Oestrogen Treatment of Diabetes

SIR,—I was very interested in the annotation on the oestrogen treatment of diabetes (Jan. 23, p. 107). It may interest you to note that I have observed in several cases the beneficial effects of the male hormone in reducing glycosuria and elevation of the blood sugar. One's observations on the male hormone in relation to this particular problem bear out what one has so often observed in other circumstances—i.e., that the male hormone is less an antagonist of the female than an equivalent and sometimes a dominant. Expressed otherwise, in some conditions—e.g., post-involutional depressions in women—where you get a good result with the oestrogens, you can often anticipate an even better result if you switch over to testosterone. I have observed the beneficial effect of testosterone in other conditions—e.g., thyrotoxic states.

I am convinced that the future will reveal a far more ubiquitous usefulness for sex hormones, particularly the male. I feel that one is a little too diffident in experimenting with these problems in widely differing conditions. One feels illogically that one is utilizing something like a "cure-all." I think we shall find that the sex-gland products are among the most ubiquitously useful of all therapeutic agents, and that inability to recognize this fact is responsible for a great deal of retardation in the development of therapeutics. For instance, despite the fact that it is established that in certain cases of hyperpiesis the hormones, the oestrogens in particular, will reduce blood pressure with the most beneficial effects where nothing else will, I encounter such cases, not by any means frequently, but steadily and persistently, and it surprises me greatly that such methods are not more widely used.—I am, etc.,

Bath. A. GUIRDHAM.

Thrombophlebitis of the Cavernous Sinus

SIR,—Dr. A. R. C. Doorly, in his interesting account of a case of thrombophlebitis of the cavernous sinus (Jan. 9, p. 42), discusses the surgical treatment of the established condition and of the local lesion, concluding that the safest course is the combination of sulphathiazole therapy with repeated transfusions. There remains one simple surgical measure of very considerable value in the prophylaxis of cavernous sinus involvement which he does not mention, although its timely employment may entirely avert that grave complication. I refer to ligature and division of the angular vein, whose tributaries include the small veins of the ala nasi. Mr. Hamilton Bailey, discussing the indications for this operation (*Emergency Surgery*, 4th edition, p. 559), says: "... the necessity for timely interference must always be before us. On the whole it is better to err on the side of activity. A sign which foretells impending danger is oedema spreading from the lip to the inner canthus, and this is usually found in the presence of suffusion of the eyelids. As far as my own observations have gone, the premonition is invariably unilateral. If in addition to this sign there is considerable elevation of temperature, the call for action is imperative."

It is, of course, impossible to determine whether in the case described ligature and division of the left angular vein on the second or third day would in fact have prevented cavernous sinus thrombophlebitis, but this operation deserves a place in any consideration of the treatment of pyogenic facial infections in the danger area.—I am, etc.,

D. STAFFORD-CLARK.

Measles associated with Unusual Nervous Signs

SIR,—The following report of a case of measles associated with unusual nervous signs may be of interest.

The patient, a girl of 4, was seen six hours after the appearance of the rash. She was tossing violently about in bed. Examination revealed this to be due to vigorous pronation–supination movements of the limbs on the left side. The head was rapidly following the direction of these movements. The child was semi-conscious, and there was urinary and faecal incontinence. The mother stated that these signs all came on suddenly about an hour before my arrival. A history of repeated attacks of vomiting since the previous day was obtained, but nothing abnormal was discovered on abdominal examination.

The temperature was 101° F., pulse rate 112, and respirations 32. The rash was typically morbilliform in appearance and distribution, and was accompanied by the usual catarrhal signs. There was no neck rigidity, nor could Kernig's sign be elicited. Tendon jerks on the affected side could not be estimated due to the violent muscular movements, and were absent on the opposite side. There was a weak extensor plantar response on the affected side, and a normal flexor response on the other. Both pupils were dilated and equal and sluggishly reactive to light. The cutaneous abdominal reflexes were present and brisk. The cheek muscles on the affected side were markedly less prominent than those on the other, but there was no facial paralysis. The mother stated that the discrepancy in the size of the cheeks had been present from birth. The confinement had been normal, no instruments were used, but the child had had "violent muscular twitchings" for four days after delivery. These had then subsided, and the child made normal progress, although it was "slightly backward in its speech" and "very perverse by nature." There was no history of any previous infectious disease, or of injury of any sort. The child was put on a mixture of sod. salicyl., tinct. camph. co., and pot. brom.

The next day (second day of the disease) the patient was much better generally. The muscular over-activity had completely subsided, but there was flaccid paralysis of the limbs on the affected side. The tendon reflexes could not be elicited on either side, but there was a very marked extensor plantar response on the affected side. The opposite plantar response was normal. The pupils were still dilated, but reaction to light was good. Vomiting had ceased, also incontinence. The temperature and pulse were similar to the previous day, but the respirations were down to 24 per minute.

On the third day the general improvement was maintained. The temperature was 99° F., pulse 92, respirations 20. The tendon jerks were present, but weak on both sides. The plantar extensor response was vigorous on the affected side. The limbs on this side were markedly improved. The child was able to raise its arm through an angle of 60 degrees, and could hold a small article (i.e., coin) in its fingers, which it could not do on the previous day. It could also slightly raise its leg. On the fourth day the child appeared a normal fourth-day measles, the only remaining abnormal C.N.S. sign being a Babinski on the left side, and this was much less vigorous than previously. Complete range of movement had returned to the left arm and leg. On the fifth day the Babinski was replaced by a flexor response, and from then onwards the child progressed normally, all abnormal C.N.S. manifestations having completely disappeared.

Osler states that out of 120 cases of measles complicated by hemiplegia, only four developed the nervous signs during the course of the fever, and the condition usually persisted. In this case all abnormal signs had disappeared by the fifth day.—I am, etc.,

Leicester. C. M. WARNOCK.

Prevention of Sterility

SIR,—Dr. E. Schleyer's three comments on the prevention of sterility (Jan. 16, p. 71) are timely, but I do feel that he has merely touched on the fringe of this important subject. All medical men are aware of the scientific reasons for sterility and the appropriate treatment, but very little attention has been paid to the non-scientific but nevertheless important group of apparently sterile marriages.

1. The couple who are over-anxious to have a child adopt excessive coitus, which results in complete saturation of the vagina with seminal fluid and vaginal secretions, which trickle out of the vagina. Secondly, excessive copulation has an adverse effect on the nerves of the man and woman, which soon leads to disharmony and marital quarrels. This affects the wife deeply, and she, unhappily, dislikes the mating. This method can result in conception, but to both partners it is a nerve-wracking business and not a pleasure. Treatment is based on an explanation on the lines of the above, and separation of the couple for a time: if this is not practicable, avoidance of coitus for a time.

2. The couple who for financial reasons or even selfish reasons adopt methods of contraception and then at a later date decide to have a child. The flora of the vagina and even the normal secretion have become changed by contraceptives or by chemical douching after the act. These substances and/or the changed flora militate against the normal activity of the spermatozoa. (This does not occur with the sheath or Dutch cap.) Treatment: Douching with plain warm water; an active outdoor life; good wholesome food with an adequate amount of fat.

3. The woman who as a result of hypersensitivity and/or sensuality has a firm and prolonged "vaginismus" which at the climax expresses the seminal fluid. Treatment: Avoidance of parties, cocktail or otherwise; in other words, a quiet, ordered life: bromides; instruction of the husband how to promote an early climax in his wife so that his orgasm occurs after hers.

Having decided the cause of the apparent sterility, there are five further considerations for the family doctor. (*a*) Age—A woman in her forties may be passionately devoted to children in the abstract, but when confronted with a yelling infant of her own who requires constant attention now finds herself tied down and not able to be a companion to her husband, who finds it more comfortable to be out. Of course the maternal and infant risk is great. (*b*) Past and present health of the mother to be—albuminuria of pregnancy, for example. (*c*) The pelvic measurements—It would be very unpleasant to inform the mother that the created baby can only be delivered by Caesarean section (to a layman this is a major catastrophe). (*d*) A family history of tuberculosis, mental disease, etc. (*e*) Financial.

Lastly, I have been faced with the problem of the wife who desires a baby before her husband goes abroad. The method I have adopted is purely mechanical, and the advice given has been successful in nine cases out of eleven apparently sterile marriages. Five young couples had been married only

a short time; two cases had been married five years, one six years, and one eight years. The method adopted is as follows. The woman places one or two pillows beneath her buttocks and coitus takes place. This allows deeper penetration and seminal fluid is thrown deep into the vagina and even over the os. The woman remains in this position for the rest of the night. The most fertile time is believed to be two weeks before the period and after, or at such time when the woman is "desirous of coitus." The above idea I think is not entirely original.—I am, etc.,

Boston, Lincs. G. R. DARLEY-USMAR.

Dietetics of Pregnancy

SIR,—Mr. R. B. Fisher (Jan. 30, p. 144) is mainly critical of the results of certain field experiments. Among other statements is the following: "The work of the People's League of Health has been dealt with ably and forcibly by Doyne Bell in a discussion at the R.S.M. and has been reported on in your columns. I would refer your readers to the full report in the current issue of the *Proceedings of the Royal Society of Medicine*."

The statement made by Dr. Doyne Bell which related to the investigation by the P.L.H. was as follows:

"A research also addressed to the problem of the effect of diet upon the infant was initiated before the war by the People's League of Health, and an interim report has been published in the *B.M.J.* and the *Lancet*. Unfortunately the concept of prematurity, defined as birth before the 40th week of gestation, has been used as a yardstick to measure the success of the changed diet. In order to try to assess the suitability of such a yardstick for this purpose, I have, with the permission of Mr. Eardley Holland, taken a random series of 147 babies born in the London Hospital in 1938 and 135 babies born in 1942 and have made a histogram of their estimated gestation periods. . . . It will be seen that in 1938 the estimated gestation periods are distributed normally about the 40th week with a standard deviation of approximately ±10 days—that is, between 3 and 4%.

"This observation leads to the expectation that one-eighth of all normal gestations will terminate before the 40th week. I venture to suggest that the differences of 3.8±1.10% for primigravidae and 4.1±1.33% for the multiparae achieved by the dietetic methods adopted in the work sponsored by the People's League of Health are probably of no significance. My conclusion is reinforced by their admitted failure to influence the birth weight of the babies."

As we were the statisticians who carried out this particular analysis we think it proper that we should give an answer to the criticism passed on this work. We think that Dr. Doyne Bell's knowledge of statistical technique is somewhat imperfect, because we have never even claimed the degree of statistical significance in our results which he ascribed to them. For example, the difference in the incidence of prematurity between treated and controls, primiparae, was 3.8%, and it had a standard error due to sampling of the magnitude of ±1.58, not ±1.10 as stated by him. He has erroneously regarded the standard error of a percentage as identical with the standard error of a *difference* between two percentages.

We admit that a significant increment in prematurity was unaccompanied by a significant decline in the mean birth weights, but there is nothing contradictory in this result. A difference of 3.8% between the respective primiparae groups represents an excess of 54 premature births, and it is unlikely that this number would influence significantly the mean birth weight of the control series based on 1,512 observations (especially as all premature babies are not subnormal in weight).

As regards Dr. Doyne Bell's own data for the London Hospital, he states that in the statistics for 1938 "the estimated gestation periods are distributed normally about the 40th week." This statement is not correct, because, in point of fact, 22% of the observations were under 40 weeks and 54% over 40 weeks. It would be interesting to discover the statistical basis for his statement that "one-eighth of all normal gestations will occur before the 40th week." What is meant by normal in this instance? If it were a normal distribution, then 50% of the observations would occur before the mean value of 40 weeks. But the actual distribution recorded by him does not follow the normal curve; it is not even symmetrical. We maintain that there is no justification for his particular statements.—We are, etc.,

London School of Hygiene and Tropical Medicine. W. T. RUSSELL. W. J. MARTIN.

Obituary

SIR STCLAIR THOMSON

Dr. DOUGLAS GUTHRIE writes: It is hard to realize that Sir StClair Thomson has left us. His genial presence, his unaffected simplicity, his wide grasp of affairs, and his many interests made him a delightful friend whom it was always a real pleasure to meet. Those of us, and many we are, who accepted his kindly hospitality in Wimpole Street can never forget him as the perfect host who loved to converse with his guests in his own inimitable fashion, or to show them, with pardonable pride, some of the treasures of his charming home. Young specialists from the Provinces, distinguished foreigners, and London colleagues were all equally welcome, for he was the first to entertain the stranger when any meeting relating to laryngology was held in London. Since coming to Scotland two years ago he had renewed old friendships and had made many new acquaintances, as was natural to one so approachable and so friendly. Before settling in Edinburgh he spent some months in his native county of Argyllshire, but, as he remarked to me, he found it "too quiet for a young fellow like me." Despite his 80-odd years his heart was ever young and he loved the society of youth. An invitation to address the Students' Medical Society of Edinburgh University gave him the keenest satisfaction, his pleasure being shared by all who were privileged to hear his sparkling description of "A House-surgeon's Memories of Lister." It was characteristic of Sir StClair Thomson that one of his last acts was to visit in a sanatorium near Edinburgh a medical man suffering from tuberculosis of the larynx. "Not that I can do much for him," he remarked, "but I can at least tell him of my own experience, and that always cheers a patient up." Sir StClair Thomson was the embodiment of cheerfulness, and what sweeter memory could he leave with us, his friends and colleagues?

Dr. ALFRED COX writes: The tributes to Sir StClair Thomson in the *Journal* are a graceful and fitting memorial to a great doctor, but I miss any reference to his particular services to our Association, which were many. I do not allude to his official connexions with our Annual Meetings, but to those services which are unrecorded. When I was Medical Secretary I often had to appeal to him for help and never in vain. Once, when the Section of Laryngology seemed likely to be a failure, owing to certain personal difficulties, he intervened at my request at the last moment and succeeded in steering us round a very awkward corner. Nobody but he could have done it. And those who were present at the Annual Meeting Dinner at Winnipeg could never forget the way in which he intervened at a critical moment when disaster seemed to be imminent. The room was very crowded; some of those at the back had difficulty in seeing and hearing; there had been two very long and rather dreary speeches; and the younger and more remote sections of the dinner party began to be decidedly restive. The President changed the order of the toast, called on Sir StClair Thomson, and in two sentences he had the whole company cheering and laughing. I have heard of similar instances, but this one remains deeply impressed on my mind. Tact and a supreme gift for diplomacy and friendliness were among his great gifts. I doubt whether there was any man in our profession in his time more deservedly popular and loved than he was.

ROBERT HENRY PARRY, F.R.C.S.ED.

The death of Mr. Robert Henry Parry, which occurred in London on January 22, will stir feelings of regret in many who recall their memories of the Glasgow School in the period 1890–1920. Not favoured by early fortune, he overcame by ability and by hard and sincere work many difficulties, and reached an established and recognized position as a surgeon and teacher in Glasgow and the West of Scotland. In one respect he was granted a special opportunity, for he lived in the day when a new hospital was built—the Victoria Infirmary, Glasgow—and he was appointed by a courageous board of directors as surgeon in independent charge of wards at a comparatively early age. By the quality of his work he promptly

justified this appointment, and soon, developing his natural teaching ability, he attracted many students both to his clinic and to his class-room. From this developed naturally a rapidly growing consulting practice, while by his manifest sincerity and readiness to co-operate Parry was always on excellent terms with his colleagues. He cultivated a wide sympathy in the practice of surgery, and was a bold and skilful operator.

When he retired to the South of England in 1923 he had hoped to collect for publication a record of his accumulated experiences, and to cultivate laboratory research work. Unfortunately his health soon failed, and for several years before his death he was an almost helpless invalid. Hence his published contributions to surgery are relatively few in number, but in them may be recognized the thoroughness and enterprise well known to his contemporaries. It is mainly through his work at the Victoria Infirmary and at the Royal Hospital for Sick Children and through his pupils, whose devotion and gratitude to him never failed, that Parry made a valuable contribution to his day and generation. He became a member of the B.M.A. in 1888 and took an active part in the Annual Meeting at Glasgow in 1922. By his colleagues he was elected to many positions of responsibility and honour, and many of these will recall memories of his loyalty and good-fellowship. In his home and family life Parry found both help and solace, and to his widow and his two sons many friends will desire to offer an assurance of sympathy and regard.

C. O. H.

CHARLES JOHNSTON-SMITH, C.B.E., F.R.C.S.Ed.

The death of Prof. Charles Johnston-Smith at the age of 62 in St. Mary's Hospital, London, on Jan. 25 will be a source of grief to many medical men who knew him in the Far East, where he occupied an eminent position in surgery for many years. Son of an Edinburgh schoolmaster, he was educated at the Royal High School, Edinburgh, and at Edinburgh University, where he graduated M.B., Ch.B. in 1904 and proceeded to the F.R.C.S. in 1909. After occupying various surgical posts in England he went to Malaya in 1911 and joined the Government medical service. At first he worked in the small town of Seremban, and had a splendid surgical clinic there. Later he moved to Singapore, where he was senior surgeon in the general hospital and professor of surgery at the Singapore School of Medicine. He was a most dexterous and courageous surgeon, and on more than one occasion successfully sutured a cardiac wound. He made many technical improvements in the operation of splenectomy. Johnston-Smith had a commanding and distinguished appearance, the embodiment of the popular idea of a surgeon. His kindliness to his patients and all around him, and especially to the newly arrived house-surgeon, made him a much-loved man. Although deafness was a great handicap it did not make him remote, and the picture of him with hand "capped" over his ear and kindly smile will long be remembered. Notwithstanding his long stay in the Tropics and his poor health he started in surgical practice in Guernsey in 1936, the year after he retired from Singapore, and was soon as popular on that island as he had been in Singapore. He was surgeon to the Victoria Hospital, Guernsey. His life was a long struggle against pulmonary tuberculosis, which eventually claimed him after thirty years of battling against it. His ending was particularly sad, for his wife, Kathleen, to whom he was devoted, was a prisoner in Guernsey and his two daughters were far away when the end came.

Dr. ORBY RUSSELL MORGAN WOOD, who practised for many years at Woolpit, Suffolk, was the son of the Rev. Dr. Wood of Woodbridge and received his medical education at the University of Edinburgh, taking the Scottish triple qualification in 1889 and the M.B., C.M. degrees in 1890. Dr. Wood joined the B.M.A. in 1893, was a member of the Central Council from 1913 to 1918, and represented his constituency at five Annual Representative Meetings. He was vice-chairman and a member of the executive committee of the West Suffolk Division from 1914 to 1919 and represented his Division on the Suffolk Branch Council in 1920 and 1921. During the war of 1914-18 he served for three years as temporary honorary secretary of the Division. In 1921 he was elected president of the Suffolk Branch, becoming vice-president in the following year. After his retirement he was elected an associate member of the Branch in 1926.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation held on Jan. 21 the following medical degrees were conferred:

B.M., B.Ch.—R. C. Evans, A. M. N. Gardner, J. K. Hawkey, A. M. Sweet, A. W. F. Erskine, D. C. Byron-Moore, G. M. T. Tate, F. E. Lodge, Margaret Myers, Renate H. Schulz, *D. F. Barrowcliff, *B. Bevan, *W. B. Matthews, *L. P. Le Quesne, *A. I. Spriggs, *E. L. Barr, *C. S. Gardner, *R. T. C. Pratt, *D. M. Strathie, *P. Vlasto, *D. J. Arkle, *Constance L. Simpson.

* In absence.

UNIVERSITY OF CAMBRIDGE

The titles of the degrees of M.B., B.Chir. have been conferred by diploma on H. M. Comely of Girton College and P. B. Shaw and Mrs. M. E. Wehner of Newnham, and that of M.B. on Mrs. P. M. Dobbs of Newnham.

UNIVERSITY OF LONDON

The University College Hospital Medical School announces that two Goldsmid Entrance Scholarships, entitling the holder to the final course of medical study, will be offered for competition in July. They are open to students who are preparing for the degrees of the Universities of London, Oxford, Cambridge, Durham, or other British universities, or for the diplomas of the Royal Colleges of Physicians and Surgeons; also one Goldsmid Entrance Exhibition and one Filliter Entrance Scholarship in Pathology entitling holders to a reduction by £80 and £52 10s. respectively of the fees due for the full course of final medical study. Notice of intention to compete must reach the secretary of the school (from whom full particulars can be obtained), University Street, Gower Street, W.C.1, by July 3.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

A quarterly meeting of the Council was held on Jan. 30, with the President, Sir William Fletcher Shaw, in the chair.

The following were admitted: *To the Membership:* Janet E. Bottomley, Phillis Dingle, Marjorie O. Dunster, Christina McD. McTaggart, L. Resnick, G. S. Sturtridge, K. G. P. Worner.

CONJOINT BOARD IN SCOTLAND

The following candidates, having passed the final examinations, have been granted the diploma of L.R.C.P.Ed., L.R.C.S.Ed., L.R.F.P.&S. Glas.:

M. W. Awad, J. D. H. Bankier, Margaret Barker, J. S. Bateman, C. E. Bell, J. M. Bolton, J. N. G. Burns, D. S. H. Cadien, N. A. Chisholm, R. P. Cookson, J. H. Couper, Margaret M. A. Dunn, O. Elishewitz, Margaret S. Elliot, G. St. J. Frost, M. Gaines, S. J. Halkett, I. Hamilton, Isobel M. Hill, Regina Kemmerling, A. Manson, T. Notman, J. J. Polland, R. K. Richardson, J. T. Rossouw, G. Solomons, G. P. Stilley, I. Turnbull, H. W. Weisman, S. Wiederlight.

G. C. Laszlo, a graduate of a recognized foreign university, was also admitted a licentiate.

The Services

A Bar to the M.C. has been awarded to Capt. J. S. Lancaster, M.C., R.A.M.C., and the M.C. to Capt. (temp. Major) A. M. George and Capts. M. S. Chayen, G. Dison, and C. F. Young, R.A.M.C., in recognition of gallant and distinguished services in the Middle East.

The King has conferred the Efficiency Decoration of the Territorial Army on Lieut.-Col. (temp. Col.) R. E. B. Rees, M.C., Major (temp. Lieut.-Col.) C. L. Broomhead, and Major E. White, R.A.M.C.(T.A.).

Lieut.-Col. Eustace Trevor Neave Taylor, I.M.S., has been appointed C.I.E. for services in the Burma evacuation. The official citation in a *Supplement* to the *London Gazette* dated Jan. 29 reads as follows:

"Lieut.-Col. Taylor was posted in Feb., 1942, to Kalewa on the refugee organization, where, by untiring efforts, he succeeded in checking a cholera epidemic among the refugees which might have brought work on the India-Burma road to a standstill and resulted in great loss of life. On the advanced refugee camps being withdrawn he became responsible for the medical arrangements in the Manipur area, at a time when reductions of staff and the state of exhaustion and disease in which the refugees were arriving made his task particularly difficult. Before leaving he had re-established the civil medical administration in Manipur. Throughout he displayed tireless energy, complete disregard of hardship, and outstanding organizing ability."

Lieut.-Col. David Kenneth Llewelyn Lindsay, I.M.S., and Major William McAdam, I.M.S., have been appointed O.B.E. (Civil Division) for bravery and distinguished services in the Burma evacuation. The official citations in a *Supplement* to the *London Gazette* dated Jan. 29 read as follows:

"Lieut.-Col. Lindsay did magnificent work when Lashio was bombed and, by his personal influence and leadership, kept his hospital functioning at full strength and dealt with, in addition to bomb casualties, a large number of evacuees and many Chinese military patients. Although heavy fighting was going on just south of the Lashio–Hsipaw road and it was not clear how long the road would remain intact, he managed to get medical supplies to the Chinese military hospital at Hsipaw, which had been bombed and had lost all its stores. He then successfully evacuated the remainder of his patients from Lashio and stayed well in the rear, giving what medical help he could to the stream of refugees. After reaching Myitkyina he attempted to get medical supplies for the hospital. Although well aware that the Japanese Forces were advancing rapidly along the Bhamo road, he went back 20 miles to the Kasu River, but was cut off and machine-gunned by the Japanese advanced guard. He managed, however, to escape into China. His devotion to duty, cool fortitude, and courage during the Shan States retreat from the Japanese were of the highest order."

"Major McAdam was in charge of the medical arrangements in the Chindwin area during the period of evacuation, and he contributed largely to the success with which disease along this route was kept at a minimum. Although gravely handicapped by the state of the road and the lack of adequate transport, he was constantly on the move between Kalewa and Tamu, encouraging the medical staff at each of the camps, remedying, as far as he was able, deficiencies in equipment and medical stores, and generally helping the refugees on their way. He also assisted the military in the treatment and evacuation of casualties. His work was characterized by a calm devotion to duty in all emergencies."

CASUALTIES IN THE MEDICAL SERVICES

Prisoners of War.—Major S. C. Colbeck, I.M.S., Acting Major D. P. Dewe, I.M.S., Capt. A. K. Eastwood, R.A.M.C.; Capt. J. E. Ennis, I.M.S., Temp. Major G. A. Graham, I.M.S., Acting Lieut.-Col. W. J. Leslie-Neal, I.M.S., Major S. G. Nardell, I.M.S., Lieut.-Col. L. G. Pearson, I.M.S., Capt. R. de Soldenhoff, I.M.S., Capt. E. H. Wallace, I.M.S., Lieut.-Col. R. A. Warters, I.M.S., Capt. E. D. H. Williams, R.A.M.C.

Missing.—Surg. Lieut. J. Robertson, R.N.

Medical Notes in Parliament

Tuberculosis Mortality

On Jan. 26 Mr. ERNEST BROWN informed Dr. Russell Thomas that the death rates per 1,000 of the total population from non-pulmonary tuberculosis in 1938 and 1941 in the following areas were:

	1938	1941 (Civilians only)		1938	1941 (Civilians only)
Glasgow	0.24	0.33	Radnor	0.10	0.18
Birmingham	0.08	0.11	Rutland	0.002	0.10
Liverpool	0.13	0.24	Pembroke	0.13	0.15
Manchester	0.14	0.19	Devon	0.10	0.12
Sheffield	0.08	0.11	Somerset	0.08	0.08
Leeds	0.12	0.10	Westmorland	0.08	0.14
Edinburgh	0.16	0.18	Bucks	0.08	0.09
Bristol	0.10	0.15	Dorset	0.10	0.07
Huntingdon	0.14	0.10	Bedford	0.10	0.11

The rates shown for 1941 must be regarded as being subject to varying and unknown degrees of distortion, owing to the fact that deaths occurring in institutions would have been assigned to the former areas of residence while the populations of such areas might have been materially diminished or augmented through evacuation or other war conditions.

The numbers of deaths of children under 15 years of age from non-pulmonary tuberculosis in 1938 and 1941 in the following areas were:

	1938	1941		1938	1941
Birmingham	36	50	Rutland	—	1
Liverpool	58	103	Pembroke	4	6
Manchester	49	55	Montgomery	4	1
Sheffield	22	34	Devon	14	23
Leeds	35	33	Wiltshire	11	25
Bristol	11	21	Somerset	8	21
Edinburgh	29	38	Westmorland	2	4
Glasgow	154	181	Bucks	13	19
Huntingdon	2	3	Dorset	14	11
Radnor	—	2	Bedford	16	20

On Jan. 28 Mr. DOUGLAS asked Mr. Brown to give the death rates from tuberculosis in the county of London for the years 1938 and 1941 respectively. Mr. BROWN said the special war-time conditions affecting population movements in London rendered any tuberculosis death rates for 1941 entirely misleading. Mr. DOUGLAS said the figures he asked for had been compiled by the county medical officer of health and published in the *British Medical Journal*. Dr. RUSSELL THOMAS asked if the figures published in the *British Medical Journal* did not show that the tuberculosis death rate in London had increased by 67% since the war. No answer was returned.

In reply to Mr. Thorne, Mr. BROWN said that in 1938 the number of deaths from non-pulmonary tuberculosis in the towns of Essex was 136, yielding a death rate of 0.079 per 1,000 population. For 1941 the available record related to civilians only, deaths and death rate being 163 and 0.126 respectively. Comparison of the two years on the basis of these figures was misleading, partly on account of selective recruitment for the Forces and partly because these towns, while depleted by evacuation, had been charged with the deaths of previous residents who died in institutions elsewhere.

Potato Flour

Mr. MABANE, replying to Major Thornton-Kemsley on Jan. 26, said that there were various methods of producing a satisfactory potato flour. His Department had, however, been anxious to avoid the construction of extensive new plant, and to find ways of utilizing existing plant, designed for other purposes but having the requisite capacity. Preliminary experiments with this object were begun at the outbreak of war. A fair measure of success had now been attained in large-scale trials. It would be appreciated, however, that the production of a suitable flour was only one of the factors to be considered in deciding whether or not to include potato flour in bread.

Maternity Provision by Local Authorities

On Jan. 26 Miss HORSBRUGH informed Mr. Thorne that according to the returns for 1941, which were the latest in the Ministry of Health, the hospitals with maternity provision carried on by local authorities, or with which the authorities had arrangements, and the nursing homes registered with them in the following districts were:

	Maternity Hospitals	Nursing Homes		Maternity Hospitals	Nursing Homes
Hull	1	7	Sheffield	4	15
Lincolnshire	14	10	Bradford	1	8
Manchester	3	19	Essex	18	81
Cheshire	12	70			

The Ministry of Health had also set up emergency maternity homes in the rural areas for use in wartime. Of these there were three in Cheshire, one in Lincolnshire, and one in Sussex. There were also eight maternity homes or hospitals in Glasgow and 27 nursing homes.

Parliamentary Social Services Committee

Sir FRANCIS FREMANTLE has resigned the chairmanship of the Conservative Parliamentary Health and Housing Committee, which he has held for 21 years. Mr. S. Storey has been elected as his successor and the title of the committee has been changed to the Social Services Committee.

Shortage of Midwives

Mr. BEVIN, answering Sir Francis Fremantle on Jan. 28, said he was consulting Mr. Brown and the nursing and midwifery organizations to secure a better supply and distribution both of midwives and of nurses. Sir FRANCIS said the appeal made by Mr. Brown to nursing associations for midwives to remain as midwives had been useless. Many young nurses, after being trained as midwives, volunteered for general military service or went into munitions. Mr. BEVIN replied that Mr. Brown and he were attempting to organize that matter.

Expectant Mothers in Factories

Mr. HOGG asked on Jan. 28 whether the Minister of Health was satisfied with the steps taken to protect pregnant women engaged in employment in factories; and whether he was prepared to extend the present period in which employment was prohibited from one month after delivery to one of one month before and six weeks after delivery. Mr. BROWN replied that medical supervision under the Factory Acts was a matter for the Minister of Labour and National Service. Prohibition of employment was a matter for legislation. He had no authority to extend the period determined by Parliament. An extension of the prohibition could not be suggested without examination of the financial provision to be made for the women in question. Recommendations on this point were contained in the Beveridge report.

Diphtheria Immunization

Mr. LEACH, on Jan. 28, asked whether Mr. Brown knew that a boy aged 11 years developed a rare form of encephalitis after inoculation against diphtheria; that this boy was perfectly healthy until his first inoculation on July 7, 1942; whether the symptoms of encephalitis that caused his death some six weeks later began to develop after the second inoculation on August 11, 1942; how long he remained paralysed; and why this boy's

death was not attributed to antidiphtheria inoculation. Mr. BROWN said he knew of the facts. There was a varying state of paralysis during the six weeks before the boy died. The coroner, with post-mortem medical evidence before him, did not find that the very rare form of encephalitis to which death was attributable had any association with inoculation against diphtheria.

Assistant Director of Hygiene at War Office

Replying on Jan. 28 to Dr. Morgan, Sir JAMES GRIGG said the adviser on venereology to the War Office held the full-time appointment of Assistant Director of Hygiene at the War Office with the rank of lieutenant-colonel. His duties were to advise on the prevention, diagnosis, and treatment of venereal diseases in the Army. His pay and allowances totalled about £1,300 a year. This officer was a member of the Regular Army Reserve of Officers. He reported for service on Sept. 1, 1939, under the conditions of his Reserve liability, and was appointed to his present post on Nov. 25, 1939. The appointment was not advertised. Officers of the R.A.M.C. were not allowed to set up in practice in competition with civil medical practitioners, but might see patients in a consultative capacity provided that did not interfere with their military duties.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* the downward trend of measles continues, with 496 fewer notifications than in the previous week. There was a large rise in the incidence of the other infectious diseases of childhood: scarlet fever up by 246, whooping-cough by 337, and diphtheria by 234. These figures represent rises on the totals of the preceding week of 12.5%, 22.4%, and 30.6% respectively. A further substantial rise of 210 cases, 17.5%, occurred in the incidence of acute pneumonia.

The North and Wales were the most affected areas. The biggest rises were: scarlet fever—Lancashire 81, Yorks West Riding 64; diphtheria—Yorks West Riding 91, Wales 45; whooping-cough—Wales 70, Lancashire 50, Staffordshire 39, Yorks West Riding 30; acute pneumonia—Lancashire 82, Yorks West Riding 47. The rises were fairly generally distributed, but there were some large local outbreaks—of diphtheria in Yorks West Riding, Batley M.B. 53, and Denbigh, Wrexham M.B. 24; and of whooping-cough in Montgomery, Llanfyllin R.D. 31.

The decline in the incidence of measles was mainly in the North. The largest of the decreases were those of Yorks West Riding 223, Lancashire 214, Staffordshire 159, Leicestershire 153, Durham 98, Derbyshire 88, Lincolnshire 84, Hampshire 82, Cheshire 67, Warwickshire 56. A rise in the incidence was recorded in London 120, Hertfordshire 68, Middlesex 51, Bedfordshire 47, and in Wales 89.

Dysentery increased in incidence from 14 to 31 cases in Lancashire (Blackpool C.B. 11, Blackburn R.D. 11), from 4 to 11 in Surrey (Chertsey U.D. 8), and in Essex from 15 to 19 (Colchester M.B. 13). A drop was recorded in London from 18 to 11. The four counties accounted for over 63% of the total cases in the country. There was a rise of 17 on the previous week's figure.

In *Scotland* the only changes of note were a fall of 78 in the notifications of scarlet fever and a rise of 40 in the incidence of acute primary pneumonia.

In *Eire* the large increase in the total of whooping-cough was due to delayed notifications: 75 cases occurring in November and December in a Dublin institution were included in this week's returns.

Influenza

A seasonal rise in the mortality from influenza occurs during the first months of the year, and following the expected trend the deaths from this disease have risen during the past few weeks. In the great towns 100 deaths were recorded during the week. It is nearly two years (March, 1941) since the mortality in a single week reached this level. Almost one-third more deaths have been reported in the first three weeks of this year than in the corresponding period of last year, but the number is only half of the total recorded in the same period of 1940 and 1939 and less than one-tenth of the 1937 level.

Returns for the Week Ending January 30

The notifications of infectious diseases in England and Wales during the week included the following: scarlet fever 2,272, whooping-cough 1,790, diphtheria 809, measles 12,601, acute pneumonia 1,528, cerebrospinal fever 113, dysentery 178, paratyphoid 33, typhoid 6. In the great towns 125 deaths were attributed to influenza.

No.3

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Jan. 23.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943					1942 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	92	8	27	1	4	136	6	25	3	6
Deaths		2	—				3	2		
Diphtheria	998	58	233	99	24	905	21	211	30	35
Deaths	19	1	6	4	1	31	2	4	4	2
Dysentery	113	11	25		—	103	4	37		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	2	—	1		—	3	—	1		—
Deaths		—	—				—	—		
Erysipelas			60	16	2			58	7	1
Deaths		—	—				1	—		
Infective enteritis or diarrhoea under 2 years				18						
Deaths	37	—	8	6	2	42	9	5	—	1
Measles	11,827	750	375	6	38	969	143	96	86	5
Deaths	16	—	1	•1	—	—	—	—	—	—
Ophthalmia neonatorum	69	4	24		2	83	7	11	1	—
Deaths										
Paratyphoid fever	1	—	2	—		9	—	1	—	
Deaths		—	—	—	—	—	—		—	
Pneumonia, influenzal*	1,404	86	22	5	6	1,158	71	18	1	14
Deaths (from influenza)	100	13	6	2	1	74	10	5	1	3
Pneumonia, primary			316	22				371	22	
Deaths		—		23	12		94		11	17
Polio-encephalitis, acute	—	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	3	—	3	8	—	7	—	1	2	1
Deaths		—	—				—	—		
Puerperal fever	—	2	12	3	—	—	—	14	—	—
Deaths		—					—			
Puerperal pyrexia	187	16	19		3	145	14	25		8
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,203	158	361	38	57	1,076	33	216	35	16
Deaths	1	—	2	—	—	—	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	7	1	2	3	1	9	2	2	10	1
Deaths	—	—	—	—	—	—	—	2		
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,841	133	129	120	8	1,512	176	60	54	25
Deaths	12	1	2	6	—	10	2	3	—	
Deaths (0–1 year)	440	51	80	66	30	416	51	77	29	36
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	5,832	1,046	730	280	150	6,075	1,003	763	251	170
Annual death rate per 1,000 persons living)			16·5	18·4	‡			17·2	16·7	‡
Live births	6,251	797	949	383	286	4,423	455	687	287	198
Annual rate per 1,000 persons living			19·4	25·2	‡			14·2	19·1	‡
Stillbirths	249	17	46			190	14	44		
Rate per 1,000 total births (including stillborn)			46					60		

• Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

A meeting of the Tuberculosis Association will be held at 26, Portland Place, W., on Friday, Feb 19, at 2.45 p.m., when a colour film on "The Treatment of Pneumonia" will be shown, and there will be a discussion on the report of the M.R.C. Committee on Tuberculosis in Wartime.

A lecture entitled "Belief," arranged by the British Institute of Philosophy, will be given by Prof. H. H. Price, Wykeham Professor of Logic in the University of Oxford, at University Hall, 14, Gordon Square, London, W.C.1, on Feb. 19 at 5 p.m. Cards of admission may be obtained free of charge from the Director of Studies at University Hall.

A meeting of the Middlesex County Medical Society will be held at Hillingdon County Hospital, Uxbridge, on Saturday, Feb. 20, at 3.30 p.m. The programme is as follows: Mr. L. Fatti: "Extra-pulmonary Bronchial Cysts"; Dr. E. B. Jackson: "Schaumann-Boeck's Sarcoidosis," discussion to be introduced by Dr. C. Alan Birch and Dr. A. C. Counsell; Mr. H. Hanley: "Stress Incontinence in Women." Visitors, especially members of the American and Canadian Forces at present in this country, will be welcome.

A meeting of the Diagnosis Section of the Faculty of Radiologists will be held at 32, Welbeck Street, W., on Saturday, Feb. 20, at 10.30 a.m., when Dr. J. Blair Hartley and Major Eric Samuel will open discussions on "Stress Fractures" and "The Significance of Some Developmental Abnormalities of the Hip-joint" respectively.

A London Conference on Health, arranged by the London Trade Union and Labour Movement, will be held on Sunday, Feb. 21, at Conway Hall, Red Lion Square, London, W.C.1, from 2.30 to 7.30 p.m. At the first session Dr. T. O. Garland will speak on health in industry, and at the second Dr. Joan McMichael will open a discussion on health in the boroughs. The conference fee is 1s.

The Charter Centenary meeting of the Pharmaceutical Society of Great Britain will be held at 17, Bloomsbury Square, W.C., on Thursday, Feb. 18, at 7 p.m., when the president, Mr. W. Spencer Howells, will give an address.

A demonstration of postural and remedial exercises, including the showing of the R.A.F. film "Fighting Unarmed," has been arranged by kind permission of the Air Ministry, at the Seymour Hall, Seymour Place, Bryanston Square, London, W.1, on Wednesday, March 3, beginning at 6 p.m. All registered medical practitioners are cordially invited to attend. Admission is free by ticket, obtained on application to the Acting Secretary, Board of Registration of Medical Auxiliaries, B.M.A. House, Tavistock Square, London, W.C.1.

Tuberculosis officers of local authorities are to be asked to furnish reports on the condition of ex-soldiers who are in receipt of a disability award for pulmonary tuberculosis contracted during peace-time service, and who are at present periodically examined by a medical board. A Ministry of Health circular (No. 2757) states that it is hoped thus to obviate the need for regular attendance of these men at medical boards. The report, for which 5s. will be paid, will be made, in response to a request from the Army medical authorities, on Form 228 and should be returned as directed together with a claim on Army Form P.1922 for the fee.

The publication of several reports which have attracted wide attention (including a memorandum summarizing official policy on A.R.P., and an address by Prof. J. A. Ryle on "Hospitals and Air Raids"), the issue of Press announcements, and monthly committee meetings addressed by invited speakers were a few of the many activities during 1942 of the National A.R.P. Co-ordinating Committee. The committee has also stimulated local conferences on Civil Defence all over the country, and has carried out an investigation into the state of the "public knowledge of A.R.P." which, in the committee's view, is regrettably low.

Application is invited for Leverhulme Research Fellowships and grants in aid of research. They are intended for senior workers who are prevented by routine duties or pressure of other work from carrying out research. They are limited to British-born subjects normally resident in Great Britain. In exceptional circumstances the condition as to residence may be waived. The trustees will also consider applications from groups of workers engaged upon co-operative programmes of research, particularly from those engaged upon long-distance programmes or in institutions in which the normal facilities for research have been curtailed by the war. The duration of the awards will not normally extend over more than two years or less than three months, and the amount will depend on the nature of the research and the circumstances of the applicant. Forms of application may be had from the secretary, Dr. L. Haden Guest, M.P., Leverhulme Research Fellowships, Unilever House, Blackfriars, London, E.C.4. Applications must be received by March 1.

There is an acute shortage of accommodation for maternity cases in several areas in Yorkshire in both private and municipal institutions. Leeds Maternity Home has had to refuse bookings for 400 cases during the last 3 months, and all its beds are taken for 2 or 3 months ahead. Among the steps being taken to meet the situation are the opening of 50 to 80 beds at St. Mary's Infirmary, Leeds, the adaptation of three wards at the Staincliffe County Hospital, and the establishment of a maternity unit at Otley County Hospital. The reasons for the shortage are given as the increased population of the cities, the greater demand for institutional confinement (Halifax General Hospital had 1,200 maternity cases last year), and the fact that beds are still kept for air-raid casualties.

An Association for the Advancement of Psychoanalysis has recently been founded in New York.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

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B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

LETTERS, NOTES, ETC.

Control of Venereal Disease

Dr. LENNOX JOHNSTON writes: The suggestion implicit in Dr Margaret Rorke's letter (Jan. 9, p. 53) of the desirability of re-educating the public about venereal disease and sex is, I think, supported by a case which has come to my notice. The patient, a man of about 35 who had contracted syphilis, committed suicide. Patients at the treatment centre became aware of his complaint, and in this way his fellow-workmen also knew what was wrong with him, and accordingly their attitude underwent a change which hurt him deeply. This, I believe, was largely responsible for his suicide. I think that education on sex and venereal disease would best be carried out over the wireless. Weekly talks by medical psychologists on the many practical problems connected with sex, and occasional talks on venereal disease, would quickly take from sexuality the shame and guilt with which, owing principally to the taboo, it is so often associated, and which are the underlying psychological barriers to the adequate control and treatment of venereal disease.

Medical Aspects of Workmen's Compensation

Dr. G. F. WALKER (Peterborough) writes: The review of Dr. Jordan's book (Jan. 2, p. 13) contains two statements which cannot be allowed to pass without comment. Your reviewer states that no volume similar to this has yet been written or published in the United Kingdom. May I draw attention to the fact that my own book, *The Injured Workman*, was published in Bristol in 1933. There are, of course, several other books quite well known to those familiar with workmen's compensation and all written and published in the United Kingdom. Your reviewer's second proposition that the medical profession have not hitherto regarded workmen's compensation as important is almost too naïve to be dealt with.

Safe Milk and Milk Products

Dr. WILLIAM HUNTER (Newcastle-upon-Tyne) writes: Following the plea of Dr. Arthur G. Watkins (Jan. 30, p. 140) for a safe milk supply, and looking ahead, may I suggest that steps should also be taken to ensure that milk products, such as butter, cream, ice cream, and cheese, will also be made to conform with reasonable standards of cleanliness and safety.

Disclaimer

Dr. A. KERR CLARKSON wishes to emphasize that the statement attributed to him in press reports of a lecture he gave on accident prevention to the Industrial Welfare Society recently is entirely incorrect.